Vernonia
TRANSPORTATION SYSTEM PLAN UPDATE
VOLUME II APPENDIXES

PREPARED FOR

City of Vernonia

WITH SUPPORT FROM

Oregon Department of Transportation

Oregon Department of Land Conservation and Development

JUNE 2011

TBG053111144220PDX 410377.04.04

APPENDIX A

PUBLIC INVOLVEMENT

Project Advisory Committee (PAC) Materials

Four PAC meetings were held over the course of the Vernonia TSP Update process:

Meeting Number	Date	Purpose
1	September 16, 2010	Introduction to the process, project, TSP 101, review existing conditions technical work.
2	November 17, 2010	Confirm Project Goals, review existing and future conditions, gather feedback
3	February 16, 2011	Review potential projects, discuss street cross sections
4	April 20, 2011	Review Prioritization and project timeframe, review funding sources.

The following pages include materials, agendas, and summaries of the meetings described above.

CITY OF VERONIA

TRANSPORTATION PLAN UPDATE

PROJECT ADVISORY COMMITTEE (PAC)

MEETING ANNOUNCEMENT

Thursday September 16th, 2010

3 – 5:30 pm

Vernonia Learning Center

PAC: Randy Parrow, Don Wallace, Tim Bero, Jeff Burch, Jeff Harrington, Ken Cox, Janet Wright, Gary Fish (DLCD), WOE, Fire District, Mike Pihl, Scott Laird

Thank you for participating in this important city project. We expect to have four meetings between now and April. Please attend this kick-off meeting, meet the consultants and learn more about the project. If you have any questions, please call Carole Connell at 503-297-6660 or connellpc@comcast.net

AGENDA

Introductions - previous experience in Vernonia.

Summary of the Project → TSP 101? > Me. → goals & policies

Role of the PAC

Schedule → new version. → Larry.

Transportation Issues

Tour (optional)

Project Advisory Committee/Project Management Team Meeting #1: Vernonia Transportation System Plan Update

ATTENDEES:

Dean Smith, Vernonia Fire Department

Jeff Burch, Vernonia Public Works

Gary Fish, DLCD

Don Wallace, Vernonia Planning Commission

Randy Parrow, Vernonia City Council

Janet Wright, Columbia County Transit Division

Bill Haack, City of Vernonia

Sean Pickner, Vernonia GIS

Seth Brumley, ODOT

Jeff Harrington, City of Vernonia Engineer

Carole Connell, City of Vernonia Contract Planner

Mark Farmer, Western Oregon Electric CoOp

Larry Weymouth, CH2M HILL

Terra Lingley, CH2M HILL

Mike Tresidder, Alta Planning + Design

COPIES: Seth Brumley, ODOT
Larry Weymouth, CH2M HILL

FROM: Terra Lingley, CH2M HILL

DATE: Thursday, September 16, 2010
3:00-5:30 p.m.
Vernonia Learning Center

Meeting Summary

Welcome and Introductions

Carole convened the meeting, thanked the Project Advisory Committee (PAC) members for volunteering, and started introductions.

Summary of the Project

Terra talked with the group about the purpose and intent of a Transportation System Plan in a "Transportation System Plan 101" presentation and specifically what the TSP update will mean for Vernonia. The presentation discussed goals and objectives of the Transportation Plan, the project's process and defined key terms.

The goals identified in the previous TSP include:

- Operation and Safety
- Transportation Alternatives
- Air Transportation
- Finance

Role of the PAC

Larry then talked about change management, and the role that the PAC will play in advising and guiding the process to make sure that the plan is consistent with the community's needs and desires. He asked for and received an endorsement of the project process from the PAC. He talked about the PAC's role in reviewing documents and providing comments to the Project team to make sure that they are accurate and reflect issues within the City. The City's website will be used for posting information about the project and project documents. E-mail is the primary way the project team will communicate with the PAC.

The group then went around the table and talked about what a successful TSP project would look like for them.

Bill said that this was the first step to initiate an update of all of the City's documents, and it was important to get this baseline data, so if there is another flood event, the City is in a better position to leverage insurance and disaster investments.

Don noted that a successful TSP update would be a document that is used, instead of sitting on a shelf at City Hall.

Janet indicated that a successful TSP is one that would allow for continued transit to be provided to the City.

Jeff Burch is interested in an updated document with more consistent roadway standards in one place.

Jeff Harrington said that a successful TSP would be realistic and consistent with adopted plans in the state and region.

Carole would like a document that creates realistic road standards for Vernonia and that require development to either pay-in for improvements, or make improvements themselves that would make it easy to implement and provide clear guidance for the City Planner.

Randy wanted a TSP that made it possible to maintain the transportation system and had affordable projects that could ultimately be built.

Mark is interested in an update that would be a real working document and provide timelines and potential funding sources that could be realistically implemented.

Discussion: Transportation Issues

The group then brainstormed existing transportation issues including areas of concern and "near misses" that won't necessarily show up in the traffic or safety data. These were grouped by topic below:

Congestion

- Rose and 6th Avenues will be future access to the northwest corner parcel that is partly within the UGB and partly without. The parcel may develop as single family homes
- The traffic impacts from Nehalem View subdivision (49 acres, 67 single family homes) could create congestion on the local access streets
- The School creates congestion, no matter where it is located
- How to manage congestion near the school
- Missouri and Bridge intersection – the fire department has concerns about potential traffic control and impact on response times if rigs are not able to turn onto Bridge Street
- Queuing on Bridge Street in front of the Fire Station
- The property owners could be 6 months to a year away from developing near the airport.

Safety Concerns

- When turning onto Bridge Street from a side street, the parked cars obstruct the sight distance and make it hard to turn onto the street safely
- Some community members drive golf carts on Bridge Street in town – safety issue because of log trucks and other heavy traffic
- Sometimes there are bicyclists riding erratically on Bridge Street, which is another safety issue
- At times motorcyclists visit town in groups, which cause congestion and safety concerns
- The traffic light where OR 47 turns right onto Bridge Street – visitors in the summer are not aware that they need to turn to follow the highway, and don't stop at the light like they should.
- There are sight distance issues for the Stoney Point and Keasey Roads near Mellinger
- The Hawkins Park pull-out onto Bridge street has below standard sight distance; it is dangerous to pull out onto Bridge
- There are a number of scooters and other alternative vehicles on city streets and OR 47

Transit

- There is a need for established stops in town, increasing the safety and accessibility, and also to allow vehicles to move out of the traffic flow and reduce traffic disruptions from the buses.

- Is there a possibility for a park and ride in town to allow riders to park and take the bus? The site of the old WOEC building could be one option, though it should not be paved because of flooding; questions about ADA requirements
- Bus shelters and identified stops would help transit riders know where to catch the bus

Bicycle and Pedestrian Issues

- Where will the kids cut through to school?
- There are trails up and down O-A Hill
- Will the CZ trail connect to Vernonia? Will it be by the lake?
- Bike and pedestrian safety from where the sidewalk ends on the west side of the Green Bridge to and along Mist Drive.
- Intersection of Rose Ave. and Bridge Street

Street and Intersection Design

- Are there problems with drainage on city streets? A need for stormwater management?
- Once the floodplain is established, how do you provide connectivity in the floodplain?
- One issue is that Knott Street was formerly a County road, now it is a City road. It is substandard, and could be impacted by the subdivision, once the parcel sells.
- Is there an alternate route to Green Bridge? McDonald Road and Pebble Creek Road?
- Airport access road – it is substandard to serve the future development, however, it is not within the Urban Growth Boundary (UGB).
- The triangle intersection near Green Bridge sees a lot of "near misses" for vehicle accidents – it is not clear and people are unsure of how to navigate that intersection.
- Is it possible to extend California Street through to the Lake? Would the extension be needed if the land is vacated because of the floodplain?
- In the letter street area in north-central Vernonia, there are topographical constraints – where is it possible to extend the streets?
- Knott is also the only access to the Light Industrial zoning access to the parcel northeast of the City, but won't develop until it sells.
- Is there an opportunity to create a new street to the light industrial parcel? Mark mentioned that they looked a bit at creating a Laurel Street.
- Does or should Alabama Avenue connect Locker Road to Missouri Avenue?

Other Issues

- There are few handicapped parking spaces on Bridge Street and elsewhere.

- How to integrate the schools into the community beyond the transportation system – how to make them the center of the community. Moving the schools could change the "feel" in town.
- What are some other impacts on O-A Hill from relocating the school?
- The City will own 60-70 vacant single family lots, as they buy flooded properties. Could these lots be future parking, sidewalk or bike path opportunities?
- There could be seismic issues with the two bridges in town – the Rock Creek Bridge and the Green Bridge.
- Are there any ODOT plans to replace the Green Bridge?
- There is an issue with siting dumpsters – potential City code to address?

Schedule

The project schedule was reviewed, and a simplified copy of the schedule was distributed that lists the project steps and approximate meeting dates. The Community Workshop will be focused on the Bike and Pedestrian Plan. The two Community Briefings are to share information and technical results and obtain feedback at key project milestones. Tentative dates for meetings were identified, recognizing that these may shift to accommodate holidays and other conflicts. PAC members were asked to notify project leaders of meeting conflicts. The schedule for meetings will be revised as the project progresses and meeting dates are determined.

Tour

Dean Smith, Jeff Harrington, Seth Brumley, Mike Tresidder, Carole Connell, Larry Weymouth, and Terra Lingley joined in a tour of Vernonia, pointing out specific problem areas to continue the discussion about City Transportation Issues.

The project team saw the sight distance issues at Hawkins Park, general turns onto Bridge from side streets downtown, and the unofficial trails up O-A Hill adjacent to the highway. At Riverside and Bridge, there is no connection for sidewalks; a trail could be needed from Riverside up to the school. Additionally, Locker Road is substandard, and there are sight distance issues with Spencer and Texas Avenue.

Next Steps

The PAC meeting summary will be sent out to the group to finalize, and there are a couple of action items for the team to follow up on:

- Seth will look into the seismic stability and bridge condition for the Green Bridge
- The team will verify if the previously discussed expected development is within the County or the UGB.
- Technical Memo #1 will build on goals and policies in the 1999 TSP, background information and documents such as the Comprehensive Plan, and issues and objectives identified in the statement of work. The goals and policies for this TSP update will need to be revisited with the group to see if they need to be amended.

Thanks and Adjourn

The group meeting adjourned approximately 4:45 p.m. which was followed by the city tour until 5:45 p.m.

PAC/PMT Meeting #2 Agenda

TO: Vernonia TSP Project Advisory Committee and Project Management Team

FROM: Terra Lingley, CH2M HILL

MEETING DATE: November 17, 2010

MEETING TIME: 3:00 p.m.

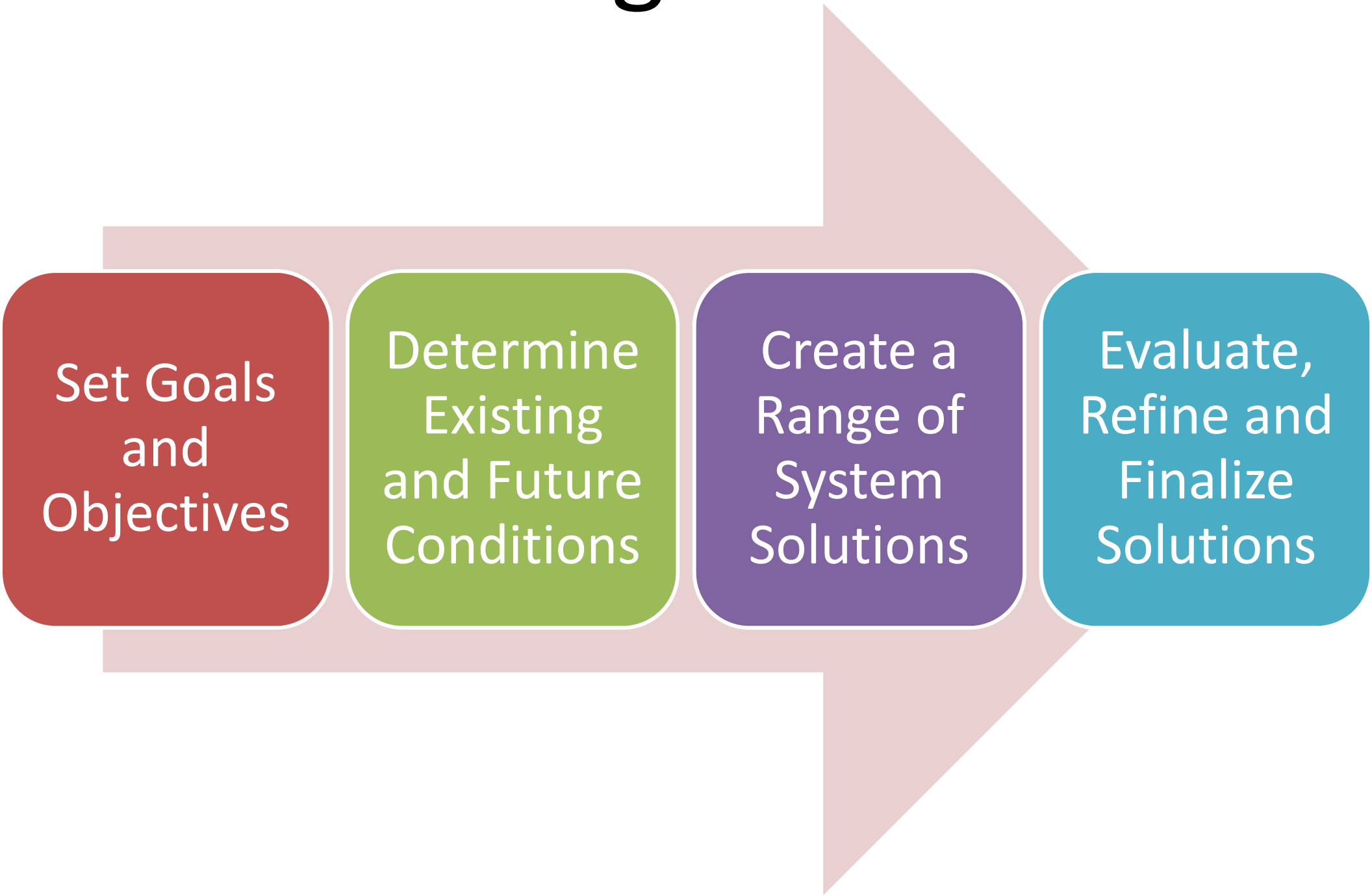
VENUE: Vernonia Learning Center

Meeting Purpose:

- Confirm Project Goals
- Review existing and future conditions, gather feedback

Time	Item	Action	Presenter
3:00 p.m.	Welcome • Introductions (any new participants) • Agenda review • Updated schedule		Carole
3:05 p.m.	Review project goals presented at last meeting: verify and discuss	Discussion	Terra
3:20 p.m.	Review existing conditions, gather feedback	Discussion	Terra, Mike
3:50 p.m.	Review future conditions, gather feedback	Discussion	Terra, Larry
4:05 p.m.	Review Safe Routes to New Schools Report, gather feedback	Discussion	Mike
4:25 p.m.	Next steps • PAC/PMT meeting #3 in January • Community workshop in January – focused on bicycle and pedestrian needs, opportunity to gather feedback on existing and future conditions • Develop Transportation System Solutions		Terra
4:30	Thanks and adjourn		Carole

Planning Process



Project Advisory Committee/Project Management Team Meeting #2: Vernonia Transportation System Plan Update

ATTENDEES:

Dean Smith, Vernonia Fire Department

Jeff Burch, Vernonia Public Works

Don Wallace, Vernonia Planning Commission

Randy Parrow, Vernonia City Council

Bill Haack, City of Vernonia

Scott Laird, Bicycle and Pedestrian interests

Tim Bero, Vernonia Airport

Dan Brown, Columbia Action Team

Seth Brumley, ODOT

Carole Connell, City of Vernonia Contract Planner

Mark Farmer, Western Oregon Electric CoOp

Larry Weymouth, CH2M HILL

Terra Lingley, CH2M HILL

Mike Tresidder, Alta Planning + Design

COPIES: Seth Brumley, ODOT
Larry Weymouth, CH2M HILL

FROM: Terra Lingley, CH2M HILL

DATE: Wednesday, November 17, 2010
3:00-4:30 p.m.
Vernonia Learning Center

Meeting Summary

Welcome and Introductions

Carole convened the meeting, went over the agenda, and started introductions.

Schedule Update

Larry talked with the group about the schedule changing, and members present received a copy of the updated schedule in their packet. The Community Workshop is tentatively scheduled for the second Thursday in January, and there is still some discussion about when the PAC/PMT meeting #3 will be held. It may be the same day, it may be later on.

Project Goals

Terra then walked through the general planning process, and talked about the importance of goals. Goals help the project team develop alternatives, and provide guidance throughout the planning process. The group then revised the goals from the 1999 TSP, editing them to be more specific about bicycles and pedestrians, and including the airport in a subheading. The project goals that were agreed on are:

- Operation and safety
  - Preserve and improve function, capacity and level of service and safety of the roadway system
- Transportation Alternatives
  - Support use of other modes, especially bicycles and pedestrians, but including transit, etc.
  - Maintain and look into expansion of airport facilities
  - Support Safe routes to schools programming and projects
- Finance
  - Sound fiscal approach to financing transportation system improvements

Review Existing Conditions

Terra went over the findings from the Existing Conditions Memo (Technical Memo #2 Existing Conditions and Needs). The handout in the packet summarizes the main points.

Land Use Inventory

- Most land in Vernonia is zoned residential
- There are some Buildable lands still available for development, mostly in residentially zoned areas, with some zoned light industrial
- There were approximately 560 jobs in Vernonia in 2008, and the main employers are the school district, government, a retreat and conference center, and WOEC.

Traffic Operations

- All 10 study area intersections operate within State and City standards
- There are currently no vehicle queues that exceed available storage capacity

Bicycle and Pedestrian Facilities

- There is a bike lane for approximately one third of a mile along OR 47 within the City Limits. The highway lacks shoulders through central Vernonia between O-A Hill and Rose Street due to topographical constraints and on-street parking
- Cyclists share the travel lane over Rock Creek and Nehalem River Bridges
- Most local streets could be considered shared roadways due to their low speeds and low traffic volumes

- There are some newly developed areas with sidewalks, though these are not always continuous
- Downtown and adjacent streets have a connected network of sidewalks with pedestrian amenities
- Maple Street, Cougar Street and Weed Avenue are lacking sidewalks near the downtown area
- O-A Hill is the main obstacle to east-west pedestrian movement within Vernonia – a sidepath along the south side of OR 47 is the only option for pedestrians
- There are very few sidewalks between O-A Hill and the Nehalem River
- Mist drive north of Bridge Street does not have any dedicated pedestrian facilities

Other Issues Brought up During Discussion

- Jeff and Bill asked about a local street condition inventory, similar to what was done for OR 47 in Technical Memo #2, and what was in the 1999 TSP. Seth mentioned that the 1999 TSP went above and beyond the information that is normally found in the TSP. Terra and Larry will provide some examples, and suggested that the best way to go about getting a street condition inventory would be to send people out to take photos of streets. Bill noted that the critical streets to have inventoried are the local streets between the two bridges and the tree streets to the east of Mist Drive/OR 47
- Bill also informed the group that the City has been negotiating with Parks and Recreation for the multi-modal path around the sewage lagoons and south of Lake Vernonia will be a permanent easement owned and maintained by the City.
- The group reiterated that the Green Bridge is a serious constraint for bicycles and pedestrian connectivity
- Carole asked that the Collector Streets be called out on all the maps, to make it easy to see where the facilities are, and the priority streets for the City
- Mark noted that with the construction of the WOEC areas, the sidewalks and other facilities on Cougar and Weed will be addressed. Bill will provide that information to the consultant team.
- Carole asked that the memo acknowledge that there are multiple standards for the streets, and that should be addressed. Terra noted that part of the solutions package will be a recommendation to revamp the street standards, which will address the issue of multiple standards. Any new standards will supplant the existing various standards. There was some discussion about whether the City would like to carry forward the urban/rural distinction for characterizing local streets, and if there will be a range of standards (curb, gutter, and sidewalks as opposed to natural drainage, etc.)
- Dan pointed out that on Figure 4a and 4b, very few of the accesses along OR 47within Vernonia meet ODOT spacing standards. Terra mentioned that this was not unusual, many of the accesses in towns throughout Oregon do not meet ODOT standards. There

was some talk about using the standards when a new permit is issued, and using the standards as a tool for development along the highway.

Review Future Conditions

The future conditions memo (Technical Memo #4 Future Conditions and Needs) will be placed on the City's website for review. Terra went through the summary with the group:

Land Use Future Conditions

- With current zoning, Vernonia's buildable land supply will be adequate to meet both residential and industrial land needs through 2031. Available commercial buildable land is not sufficient to meet the projected demand.
- The alternative land use scenario would add 9 acres of commercial land to the DT commercial district. With these 9 acres, commercial land is more than adequate to meet all land needs through 2031. The 9 acres of commercial will be added at the western end of the existing downtown area, both east and west of OR 47.
- There was some discussion about whether the light industrial and general commercial zoning near the school was included in the buildable lands summary. The project team will verify, but since they are both in the floodplain, it is likely that those two parcels are not included in the buildable lands summary.

Traffic and Transportation

- All study intersections meet mobility standards for the 2031 afternoon peak hour
- One study area intersection, Bridge Street/Rose Avenue will experience vehicle queuing on the northbound right turn lane due to the large number of vehicles who make the right turn to follow the highway. The turning vehicles slow down, causing some minor queuing that extends further than the available space for the right turn.
- Several left turn lane warrants were met for eastbound and westbound left turn movements along Bridge Street. No right turn warrants were met
- Intersection of Rose Avenue/Bridge Street is confusing for visitors.

Safe Routes to New Schools

Mike summarized the findings from Technical Memo #5 (Safe Routes to New Schools). He reviewed the existing conditions for bicyclists and pedestrians, and noted that Vernonia has a high percentage of students that walk or cycle to school, and would like to see that high percentage continue with the siting of the new school. O-A Hill is the main obstacle for students to walk or bicycle, but the current mode split shows that they are willing to traverse the hill to walk to school, and many currently do just that. He summarized the Kittelson & Associates study on how students would access the new school, and provided recommendations on how to encourage the non-motorized mode share of students going to school.

The recommendations include providing non-motorized facilities along OR 47, Texas Avenue, Missouri Avenue, Alabama Avenue and Bridge street East.

Carole asked that the memo be updated to reflect those changes/improvements that were required by the city and that will occur as the development of the school site occurs. Carole will provide that information to the consultant team.

Next Steps

Terra talked about the next two meetings/events coming up: the Community Workshop and the PAC/PMT meeting #3. These will likely happen the second Thursday in January, with more information to follow as details are ironed out. The next steps for the Project team include developing transportation system solutions to address the goals and identified existing and future needs.

Please review the technical memos provided and the technical memo on the website and provide your comments by Monday, November 29th.

Project Title ..... Project Number .....

Author ..... Date / Time .....

Participants .....

☐ Phone ☐ Meeting ☐ Site Visit ☐ Other .....

Vernonia PAC / PMT meeting #3 2/16/11

Attendees:

Terra Lingley, CH
Seth Brumley ODOT
Bill Haack CCRPAC/CCV
Willow Buech City of Vernon
Carrie Connell City
Scott Lains
Marilyn Nicks City of Vernonia
Dan Brown PC
Mike Trisidder Alta

Community Involvement Opportunities

There were three opportunities for the public to be involved in the TSP update process:

Meeting Name	Date	Purpose
Community Workshop	January 13, 2011	Share the project purpose and goals, solicit feedback on potential transportation improvements.
Community Briefing #1	February 16, 2011	Gather feedback on roadway projects and potential cross-sections. Discuss Safe Routes to School technical work
Community Briefing #2	April 20, 2011	Discuss Recommended projects and implementation and project priorities

The following pages include the meeting materials, presentations and summaries of the meetings described above.

City of Vernonia Transportation System Plan Update Community Workshop Plan

TO:	City of Vernonia TSP Update Project Management Team
FROM:	Terra Lingley, CH2M HILL
COPIES:	Larry Weymouth, CH2M HILL
DATE:	December 29, 2010

The City of Vernonia Transportation System Plan Update Project will host a Community Workshop on Thursday, January 13th, 2011 from 5:30-8:30 p.m. at the Vernonia Learning Center.
The purpose of this Community Workshop is to review the work done to date, discuss the goals of the bicycle and pedestrian plan and gather input on potential transportation alternatives.

Community Workshop Goals

- Allow community members to review the project
- Discuss potential bicycle and pedestrian facility improvements
- Gather input on the goals and objectives of the bicycle and pedestrian plan
- Review and gather input on suggestions for transportation system options

Public input will be collected through a written comment form, individual discussions with attendees, and comment boards displayed throughout the room.

Workshop format

The workshop format will allow attendees to comment on recommended projects and provide feedback to the City and project team.

One presentation will be given twice during the workshop, at 5:45 p.m. and 7:00 p.m. to inform attendees about the bicycle and pedestrian improvements. Attendees will have an opportunity to discuss the project with staff members after the presentation. The remainder of the open house time will be devoted to reviewing the existing conditions, potential improvements, and gathering input from attendees.

Community Workshop Timeline

5:30-5:45 p.m.	Welcome, time for attendees to sign in and get refreshments
5:45-6:00 p.m.	Presentation on bicycle and pedestrian improvements and programs
6:00-7:00 p.m.	Open House: attendees can circulate and view

	displays, talk to project team members individually
7:00-7:15 p.m.	Presentation on bicycle and pedestrian improvements and programs
7:15-8:30 p.m.	Open House, attendees can circulate and view displays, talk to project team individually

Workshop Advertising

In order to get the word out and make sure those who live and work in the project area attend, a variety of entities will spread information about the project.

To notify the public of the meeting the project team will:

Include a flier in the electric bill

The City will notify the Newspaper (Vernonia's Voice – What about the Independent?)

Coordinate with the City to have the meeting on the website, and flier posted in public areas

Notify PAC members and ask them to bring a friend to the meeting

Displays/Materials:

Station 1: Sign-in and welcome	
- Welcome Poster - Sign in sheets - Purpose of Tonight's Meeting	
Station 2: Project Background	
- Project Background - Schedule - Study area map with streets, city limits, and UBG - Project goals - Who is involved?	
Station 3: Existing Needs and deficiencies	
- Map with existing roadway needs and deficiencies - Map of existing bicycle facilities	

- Map of existing pedestrian facilities	
Station 4: Recommended Projects	
- Bicycle and Pedestrian suggestions (multiple boards?) - Roadway suggestions - Potential street cross-sections	
Station 5 Comments and refreshments	
- Next Steps - Comment forms - Flip charts around the room for attendees to add comments.	

Staffing

Larry Weymouth - CH2M HILL

Terra Lingley – CH2M HILL

Seth Brumley - ODOT

Mike Tressider – Alta Planning + Design

Elliot Akwai-Scott – Alta Planning + Design

Bill Haack – City of Vernonia

Carole Connell - City of Vernonia Contract Planner

Welcome to the Vernonia Transportation System Plan Update Community Meeting

Please take a moment to:

- Sign in
- Provide feedback on existing conditions and potential transportation solutions
- Fill out a comment form

Tonight we will:

- Review existing transportation, bicycle, and pedestrian conditions
- Ask for your feedback on improvement ideas along OR 47 and throughout Vernonia
  - What do you like?
  - What other things should we consider?
- Discuss Bicycle and Pedestrian improvements

A brief presentation will be given at 5:45 and 7:00 p.m. on Safe Routes to New Schools

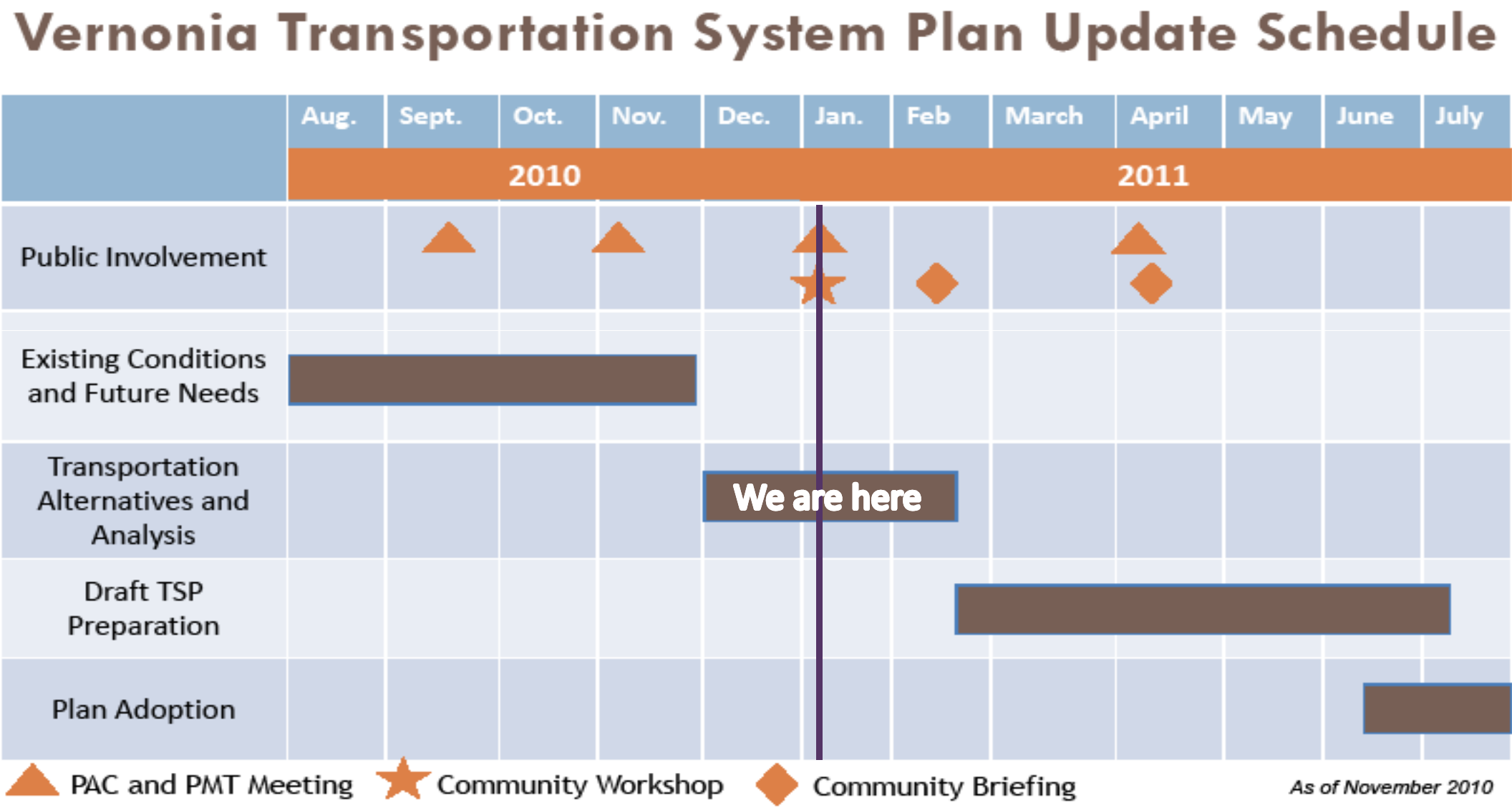
Project Background

- This Transportation System Plan (TSP) Update will add recent information to the City's 1999 TSP
- This is a long-term (20 year) plan to identify:
  - Safe Routes to new schools
  - Bicycle improvements
  - Pedestrian improvements
  - Safety improvements

Who is involved?

- The City of Vernonia
- Oregon Department of Transportation
- Columbia County
- Oregon Department of Land Conservation and Development
- The Vernonia Community
- Planning consultants:
  - CH2M HILL
  - Alta Planning + Design

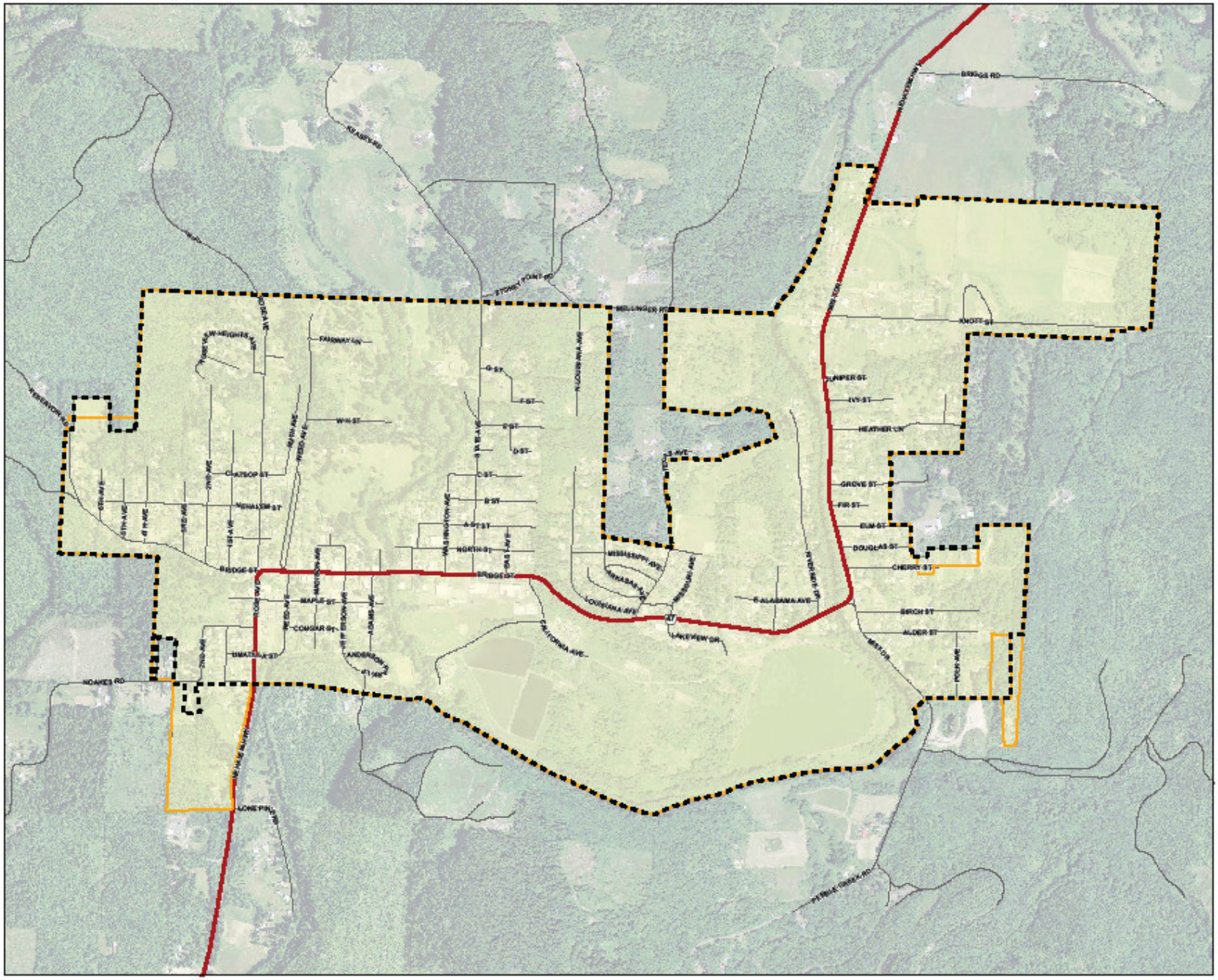
Schedule


Vernonia Transportation System Plan Update Schedule
Aug.
Sept.
Oct.
Nov.
Dec.
Jan.
Feb
March
April
May
June
July
2010
2011
Public Involvement
Existing Conditions and Future Needs
Transportation Alternatives and Analysis
We are here
Draft TSP Preparation
Plan Adoption
PAC and PMT Meeting
Community Workshop
Community Briefing
As of November 2010

Project Goals

- Operation and Safety
  - Preserve and improve function, capacity, and level of service and safety of the roadway system
- Transportation Alternatives
  - Support use of other modes, especially bicycles and pedestrians, including transit
  - Support Safe Routes to Schools programming and projects
  - Receive input on airport operations and expansion
- Finance
  - Sound fiscal approach to financing transportation system improvements

Project Study Area



LEGEND

- State Highway
- Streets
- City Limits
- Urban Growth Boundary
- Study Area

0 250 500 1,000
Feet

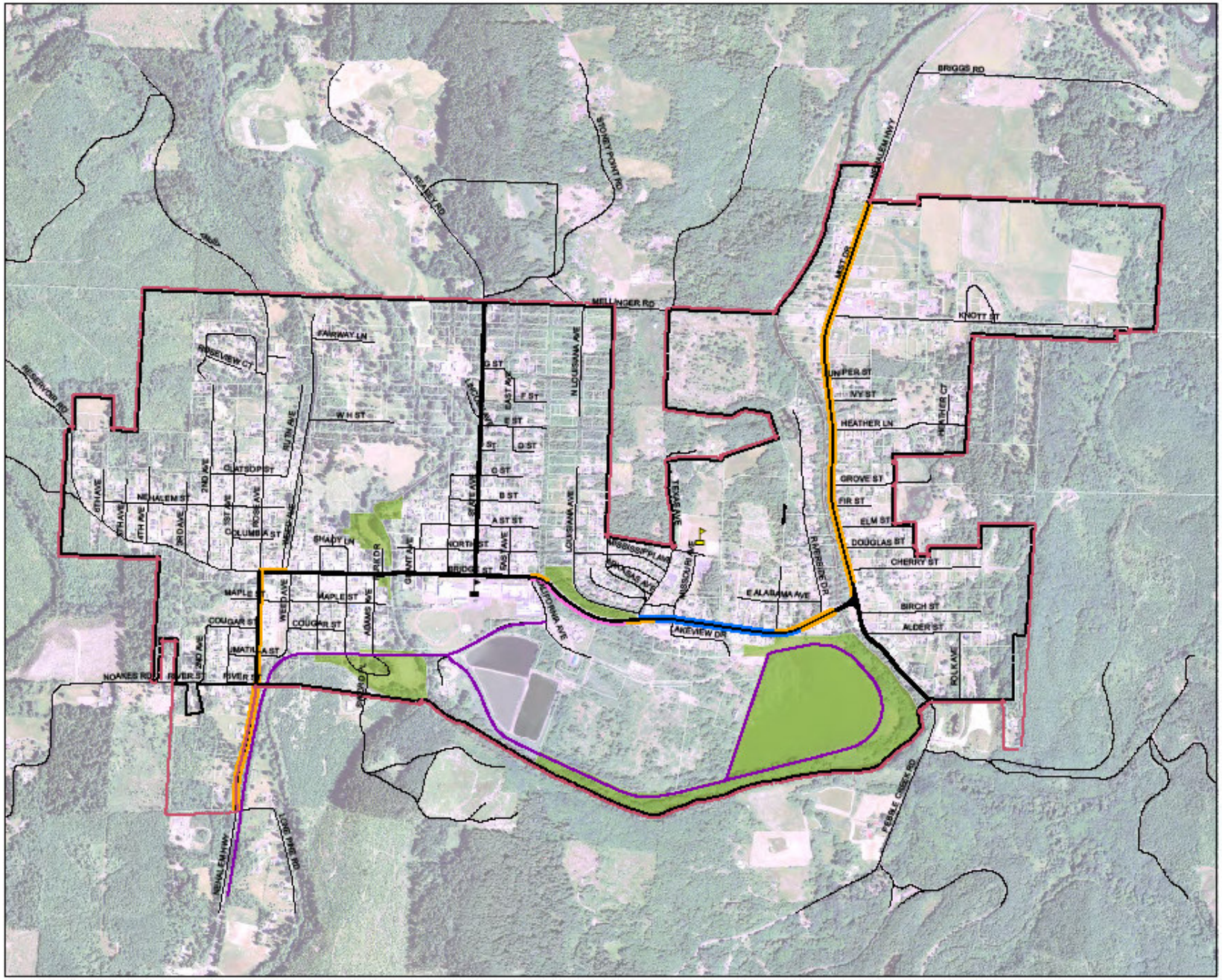
Study Area
Vernonia Transportation System Plan
City of Vernonia, Oregon

WROSA/PROJ/ODOT/41037/VERNONIGIS/MAPFILES/FIGURE_1_STUDYAREA.MXD EDURBA 10/22/2010 10:19:17

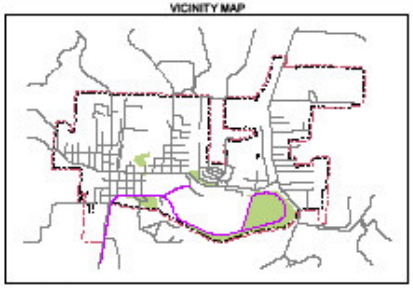
Findings to Date

- All study area intersections operate within State and City standards
- There are limited and disconnected sidewalks throughout Vernonia
- O-A Hill is an obstacle to east-west pedestrians within Vernonia
- There are only a few bicycle lanes along OR 47
- Cyclists share travel lanes over the Rock Creek and Nehalem River Bridges

Existing Bicycle Facilities



VICINITY MAP



LEGEND

- Existing Vernonia Schools
- Future Site of Vernonia Schools

Bike Facilities Inventory

- Bike Lane
- Shoulder Sidepath
- Shoulder
- Shared-Use Paths
- Inventoried Streets (Arterials & Collectors)
- Streets
- Parks
- City Limits
- Vernonia TSP Study Area

Sources:
1. UGB and City Limits - City of Vernonia, 2010
2. Streets - City of Vernonia, 2010

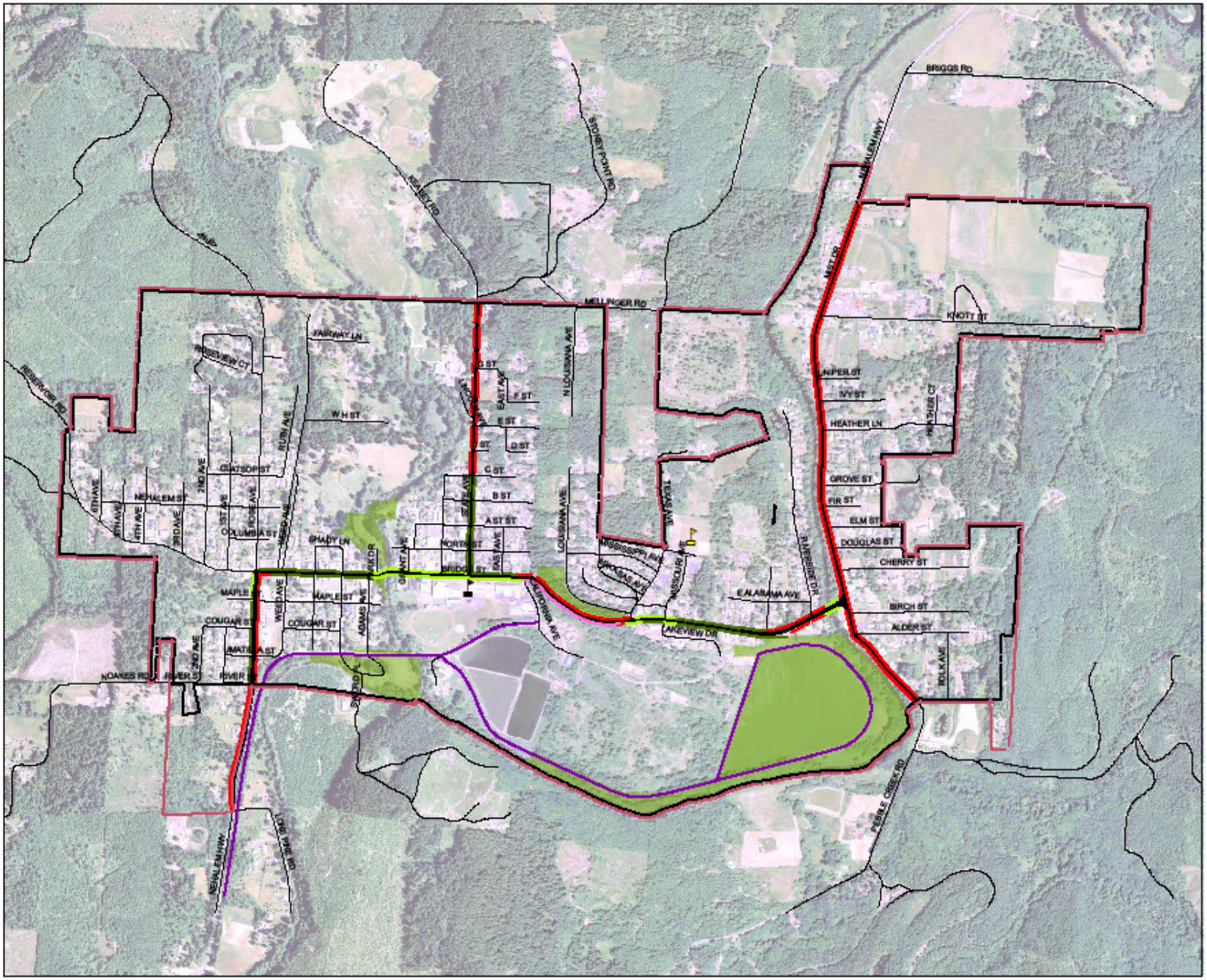
N

0 250 500 1,000 1,500 2,000
Feet

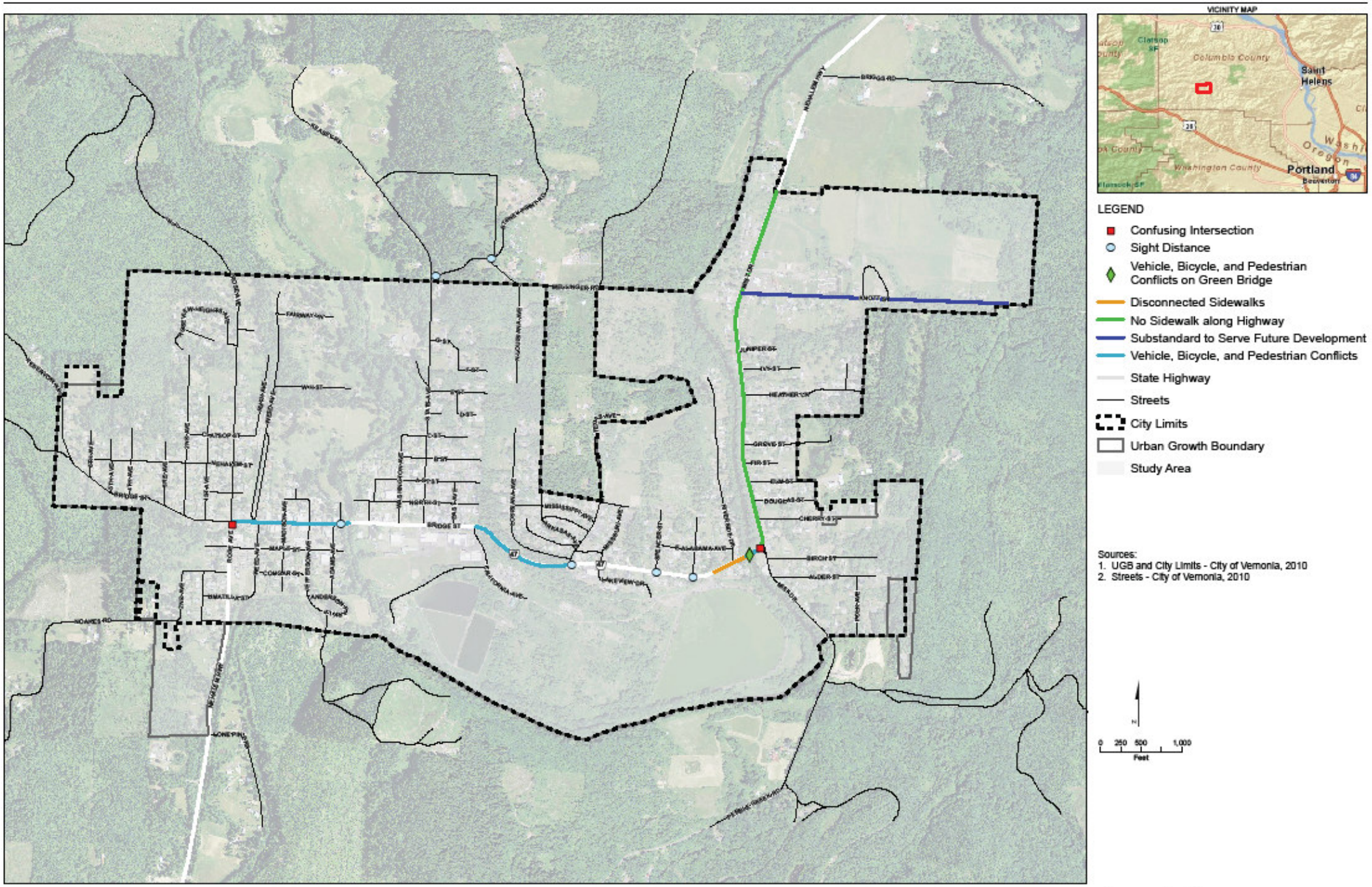
Bicycle Facilities Inventory
Technical Memo #2
Vernonia TSP

RCD V:\GIS\APPS\ESRI\ARCMAP\TEMPLATES\MXD\TABLOID_LANDSCAPE.MXD 9/19/2007 14:40:58

Existing Pedestrian Facilities



Current Roadway Deficiencies



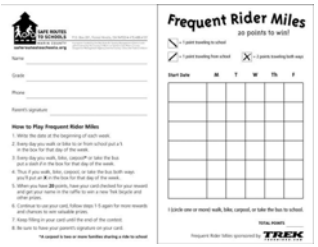
Safe Routes to School Programs

Safe Routes to School programs use a variety of strategies to make it easy, fun and safe for children to walk and bike to school.

Bicycle Rodeo
Family-friendly events that include a safety check, helmet fitting, “rules of the road” instructions, and an obstacle course. They may be offered through the local Police or Fire Department, or adult volunteers

Classrooms Lessons/Activities
Grade-appropriate lessons and classroom activities are available to teach students about walking, bicycling, health, and traffic safety. These lessons can be given by law enforcement officers, other trained professionals, or teachers, when incorporated into the subjects of health, environment, social science, math, and physics

Walk/Bike to School Day/Week/Month
Special events encouraging students to try walking or biking to school. The most well-known of these is “International Walk to School Day”, a major annual event that attracts millions of participants in over 30 countries in October



Friendly Bike/Walk Competitions
Contests and incentive programs reward students by tracking the number of times they walk, bike, carpool, or take transit to school. Contests can be individual, classroom, or interschool competitions. Local businesses may provide incentive prizes.

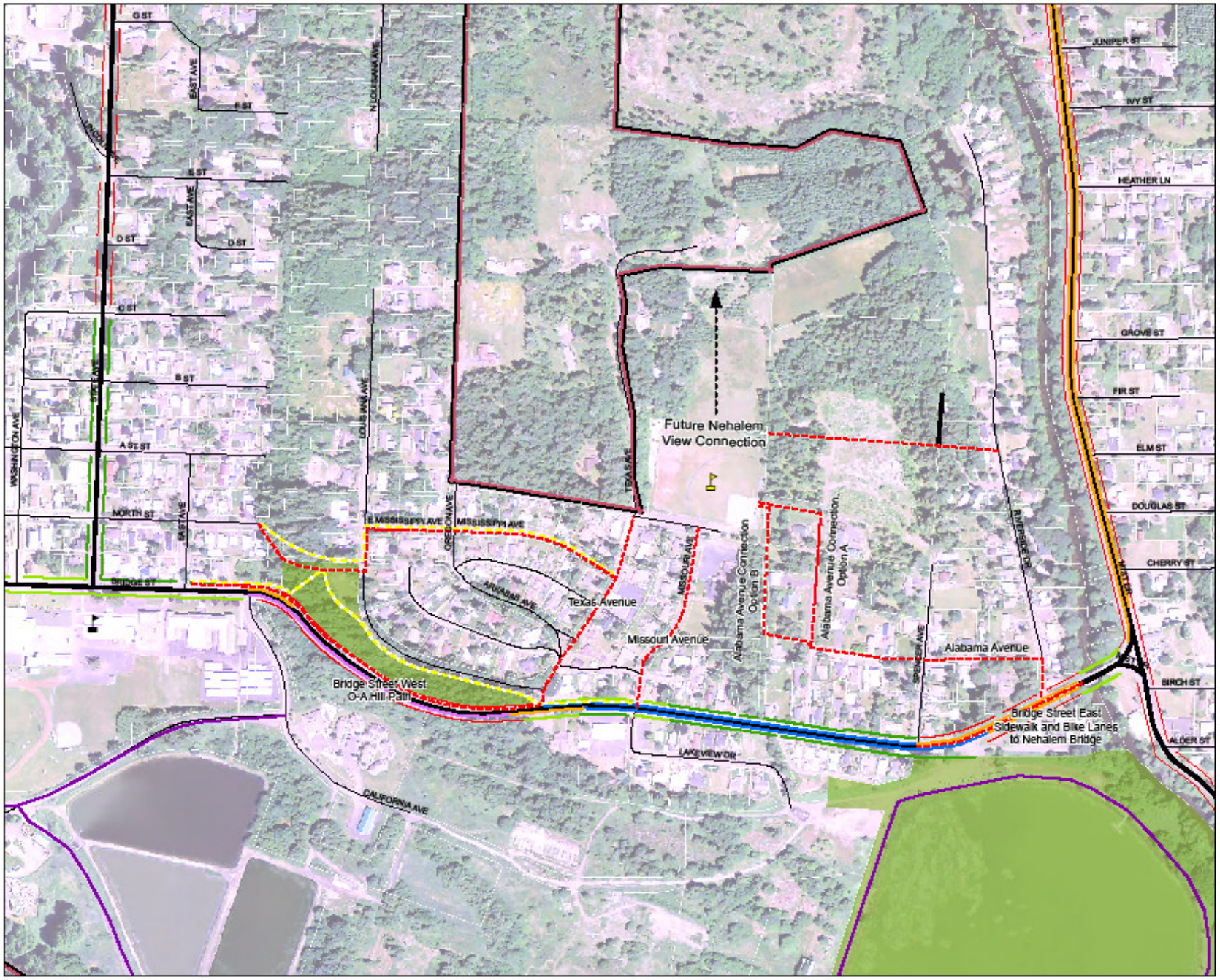
Back to School Blitz
Families set transportation habits during the first few weeks of the school year and many are not aware of the transportation options available. A “Back to School Blitz” can be used at the beginning of the school year to promote bus, carpool, walking, and bicycling.

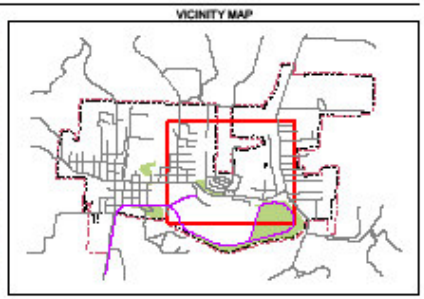
Stop and Walk
This year-round campaign encourages parents to stop several blocks from school and walk the rest of the way. This campaign allows students who are unable to walk or bike to school a chance to participate in school walking programs. It also helps reduce traffic congestion at the school.

Bike Train
Groups of students are accompanied by adults to bicycle together on a pre-planned route to school.

Walking School Bus
Walking School Buses are formed when a group of children walk together to school and are accompanied by one or two adults (usually parents or guardians of the children). As the walking school bus continues on the route to school they pick up students at designated meeting locations.

Safe Routes to New Schools





LEGEND

- Existing Vernonia Schools
- Future Site of Vernonia Schools
- Proposed Safe Routes to New Schools
- 2009 TIA Alternatives

Bike Facilities Inventory

- Bike Lane
- Shoulder Sidepath
- Shoulder
- Shared-Use Paths

Sidewalk Inventory

- Sidewalk Missing
- Attached Sidewalk
- Detached Sidewalk
- Inventoried Streets (Arterials & Collectors
- Streets
- Parks
- Vernonia TSP Study Area
- City Limits

Sources:
1. UGB and City Limits - City of Vernonia, 2010
2. Streets - City of Vernonia, 2010

Proposed Safe Routes to New Schools

Pedestrian and Bicycle Treatments

- The Project team will **update the City's TSP** to reflect bicycle and pedestrian treatments that could be used.
- Look at various treatments **found in other cities' toolkits** and tell us if you think they make sense for Vernonia.

Standard Bicycle and Pedestrian Treatments

Shared Use Paths
Provide a desirable facility separation from traffic particularly for novice riders, recreational trips, and cyclists. Paths generally provide new travel opportunities.

Wayfinding
Directional signage indicating locations of destinations and travel time/distance increases comfort with and accessibility to the pedestrian and bicycle systems.

Sidewalk Infill
Completing gaps improves pedestrian connectivity by providing a continuous, barrier-free walkway easily for all users

Curb Extensions
Reduce pedestrian crossing distance and improve motorists‘ visibility of pedestrians waiting to cross the street. Extensions can also serve as good locations for bike parking, benches, public art, and other features.

Marked Crosswalks
High-visibility markings located in areas with high pedestrian crossing volumes, near schools, and/or areas where awareness of pedestrian crossings may be poor.

Signed Routes
Designated bikeways with regularly placed signs indicate the route. Can include some wayfinding.

Bike Lanes
Marked lanes along a roadway designated for exclusive bicyclist use.

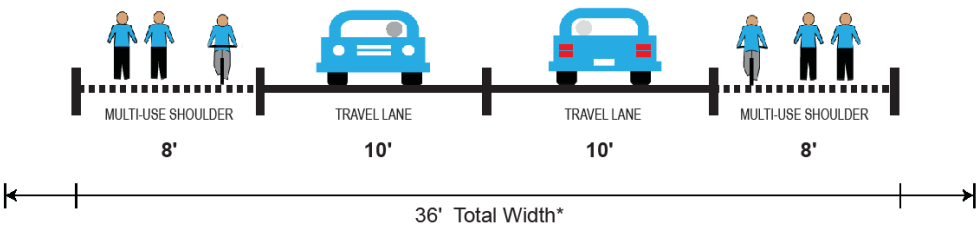
Curb Ramps Retrofits (ADA- compliant)
Retrofitting curb ramps to existing sidewalks improves the walking environment for mobility-impaired users. Curb ramps benefit pedestrians with strollers, delivery carts, and other "wheel" devices.

Potential Roadway Cross-Sections

- The TSP update will include street cross sections by classification
- Please take some stickers and place them next to the cross section alternative you prefer for **both** the local and collector street

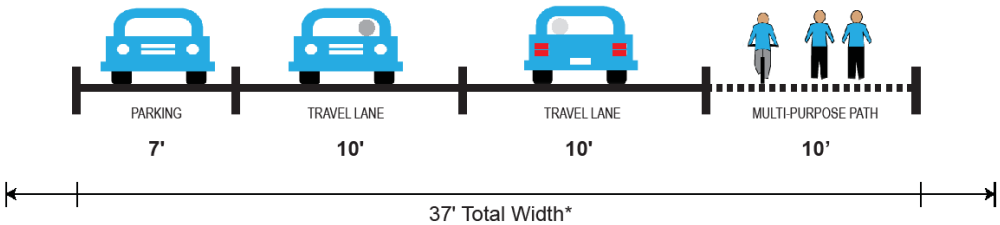
Local Road Cross Section Alternatives

OPTION 1: Two Lane with Shoulders



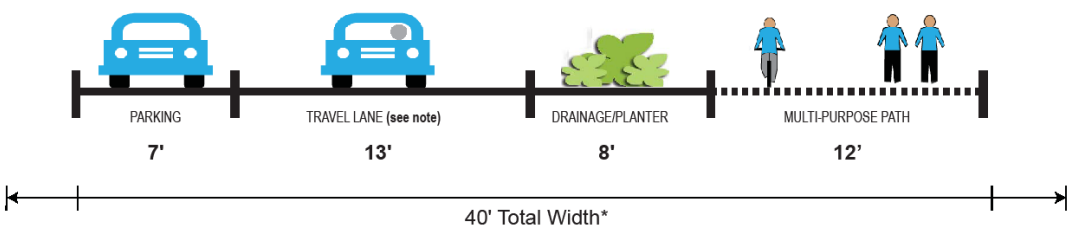
* 6' extra room

OPTION 2: Two Lane with Parking and Multi-Purpose Path



* 6' extra room

OPTION 3: Narrow Street with Multi-Purpose Path



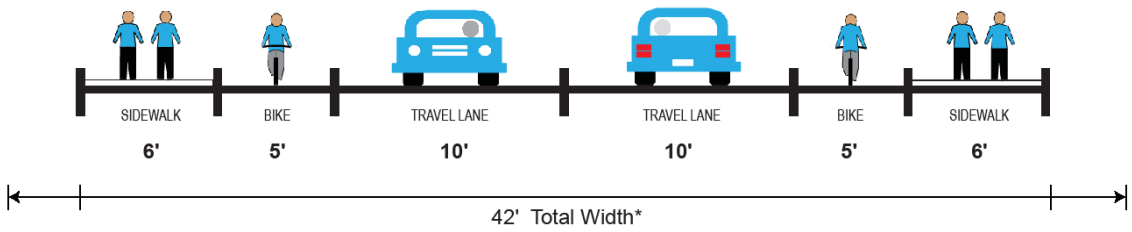
NOTE : Travel lane is too narrow for cars to pass side by side. Drivers will need to wait and pass each other when there are no cars in the parking lane.

* 6' extra room

Local roads include the “Tree Streets”, the “State Streets” (except Louisiana and State), and the numbered and lettered streets in Vernonia

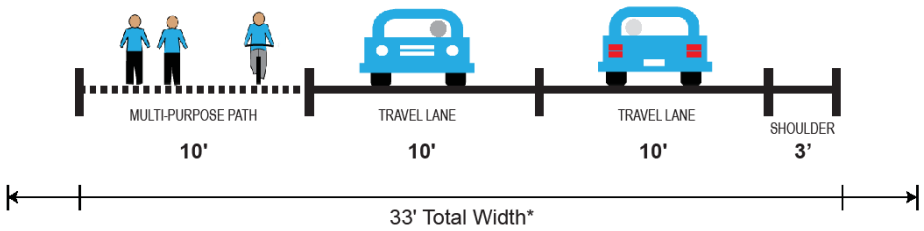
Collector Road Cross Section Alternatives

OPTION 1: Traditional Bike Lane/Curb



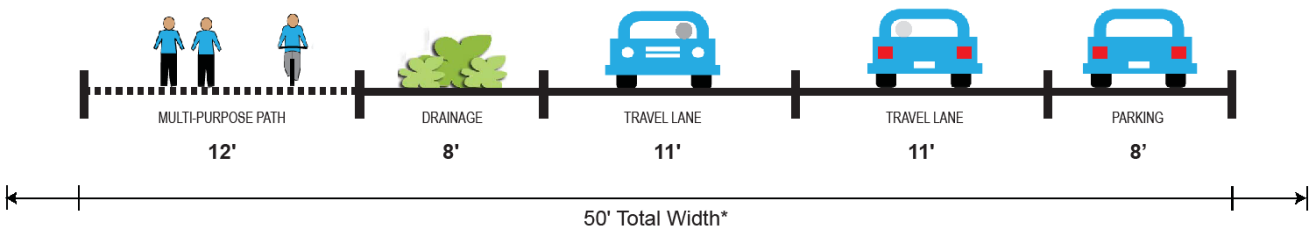
* 6' extra room

OPTION 2: Path on One Side with Curb



* 6' extra room

OPTION 3: Multi-use Path and Parking One Side



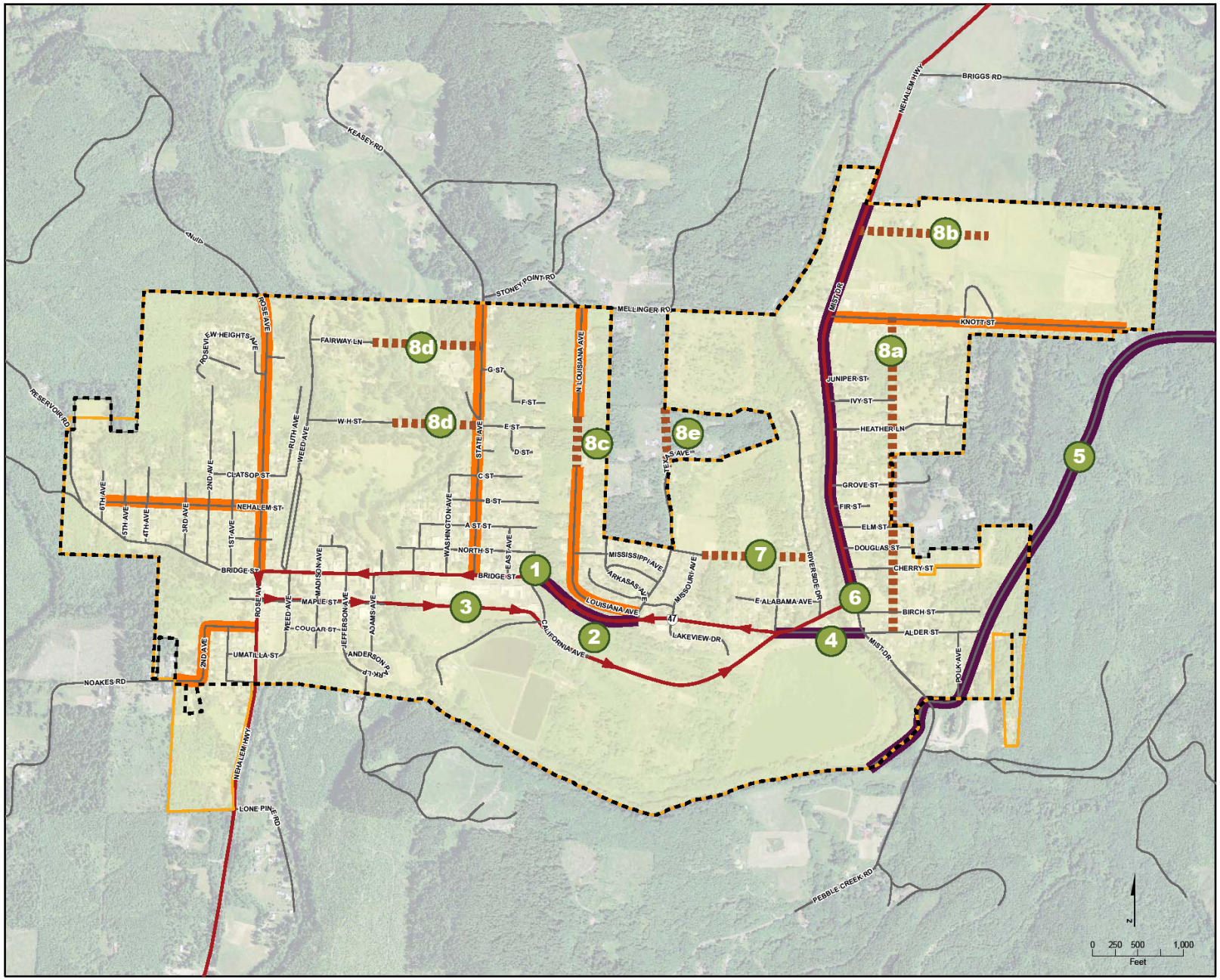
* 6' extra room

Collector roads include the following: Rose Avenue north of Bridge Street, Nehalem Street, State Avenue, Louisiana Avenue, Knott Street, and Cougar and 2nd Ave to Noakes Road.

Potential Build Alternatives

- The project team brainstormed two groups of potential alternatives:
  - High-build, long-term alternatives
  - Low-Build, short-term alternatives
- Please take a look at the following two maps and let us know what you think

Potential High-Build Alternatives



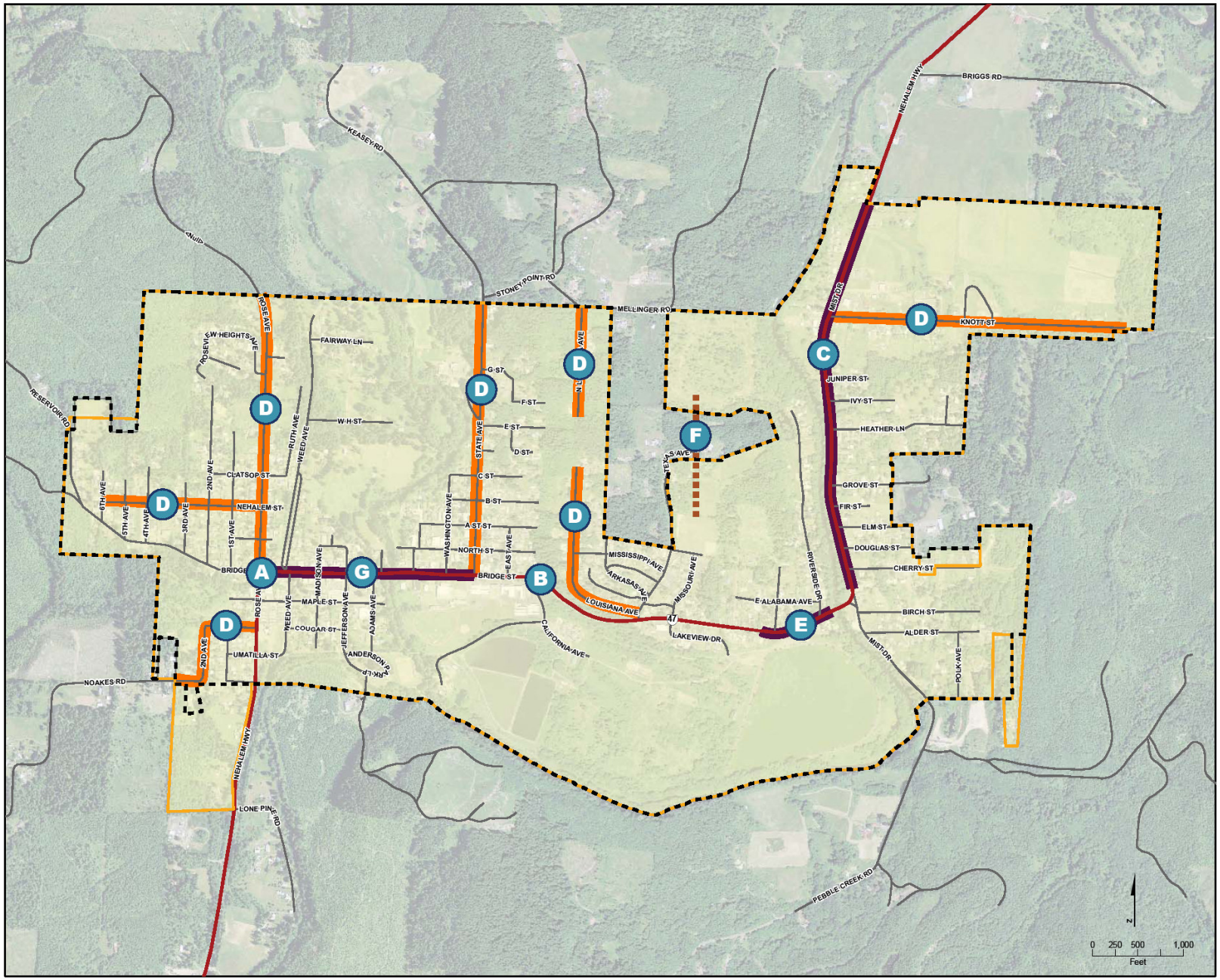
LEGEND

- State Highway
- Streets
- City Limits
- Urban Growth Boundary
- Study Area
- Collector Streets
- Recommended Street Connections
  (Location of streets connections are approximate and subject to design review process and environmental considerations)

1. Widen OR47; add bicycle/pedestrian path on both sides.
2. Shift OR47 to the south to make room for a bicycle/pedestrian path north of the highway.
3. Make OR47 a one-way couplet through Vernonia.
4. Realign Bridge Street to meet Mist Drive; keep the Green Bridge for bicycles and pedestrians.
5. Connect future Crown-Zellerbach Trail to the Banks-Vernonia Trail.
6. Reconfigure the Mist Drive/Bridge Street intersection.
7. Create a bicycle and pedestrian connection to the new school from Riverside Drive.
8. Potential connectivity improvements.

High-Build (Long Term) Options
Vernonia Transportation System Plan
City of Vernonia, Oregon

Potential Low-Build Alternatives



LEGEND

- State Highway
- Streets
- City Limits
- Urban Growth Boundary
- Study Area
- Collector Streets

A Improve signage at OR47 and Rose Avenue.

B Improve pedestrian crossing at OR47 to access the side path on O-A Hill.

C Add sidewalk along OR47/Mist Drive (east side).

D Add sidewalks or connect existing sidewalks along collector streets. Add bicycle facilities or shared lane markings.

E Improve sight distance by clearing vegetation at intersections.

F Add bicycle and pedestrian connection between new schools and future Nehalem View development.

G Consider striping for no parking at corners in the downtown core to increase sight distance.

Low-Build (Short Term) Options
Vernonia Transportation System Plan
City of Vernonia, Oregon

Next Steps

- Refine Transportation Alternatives based on feedback gathered tonight (January/February)
- Draft the Transportation System Plan Update document (February-April)
- Planning Commission and City Council will review the draft plan and vote on adoption (June/July)

Welcome to the Vernonia Transportation System Plan Update
Community Meeting

Tonight we will:

- Review existing transportation, bicycle, and pedestrian conditions
- Discuss Potential Bicycle and Pedestrian improvements
- Discuss Potential Bicycle and Pedestrian Programs

Goals

- Transportation Alternatives
  - Support use of other modes, especially bicycles and pedestrians, including transit
  - Identify appropriate new and improved non-motorized facilities
  - Support Safe Routes to Schools programming and projects

Existing Conditions - Transit

- Nehalem Valley Fixed Route
  - Vernonia City Hall (Stub Stewart, Staley's Junction, Willow Creek Station)
  - 6:15 am (returning 8:10 am)
  - 4:30 pm (returning 6:25 pm)
- West County Flex Route
  - Vernonia – St. Helens (Scappoose)
  - Tuesdays/Thursdays only
  - 8:30 am / 11:00 am / 2 pm

Existing Conditions - Bicycle

- There is a bike lane for approximately one third of a mile along OR 47 within the City Limits.
- The highway lacks shoulders through central Vernonia between O-A Hill and Rose Street due to topographical constraints and on-street parking
- Cyclists share the travel lane over Rock Creek and Nehalem River Bridges
- Most local streets could be considered shared roadways due to their low speeds and low traffic volumes

Existing Bicycle Facilities

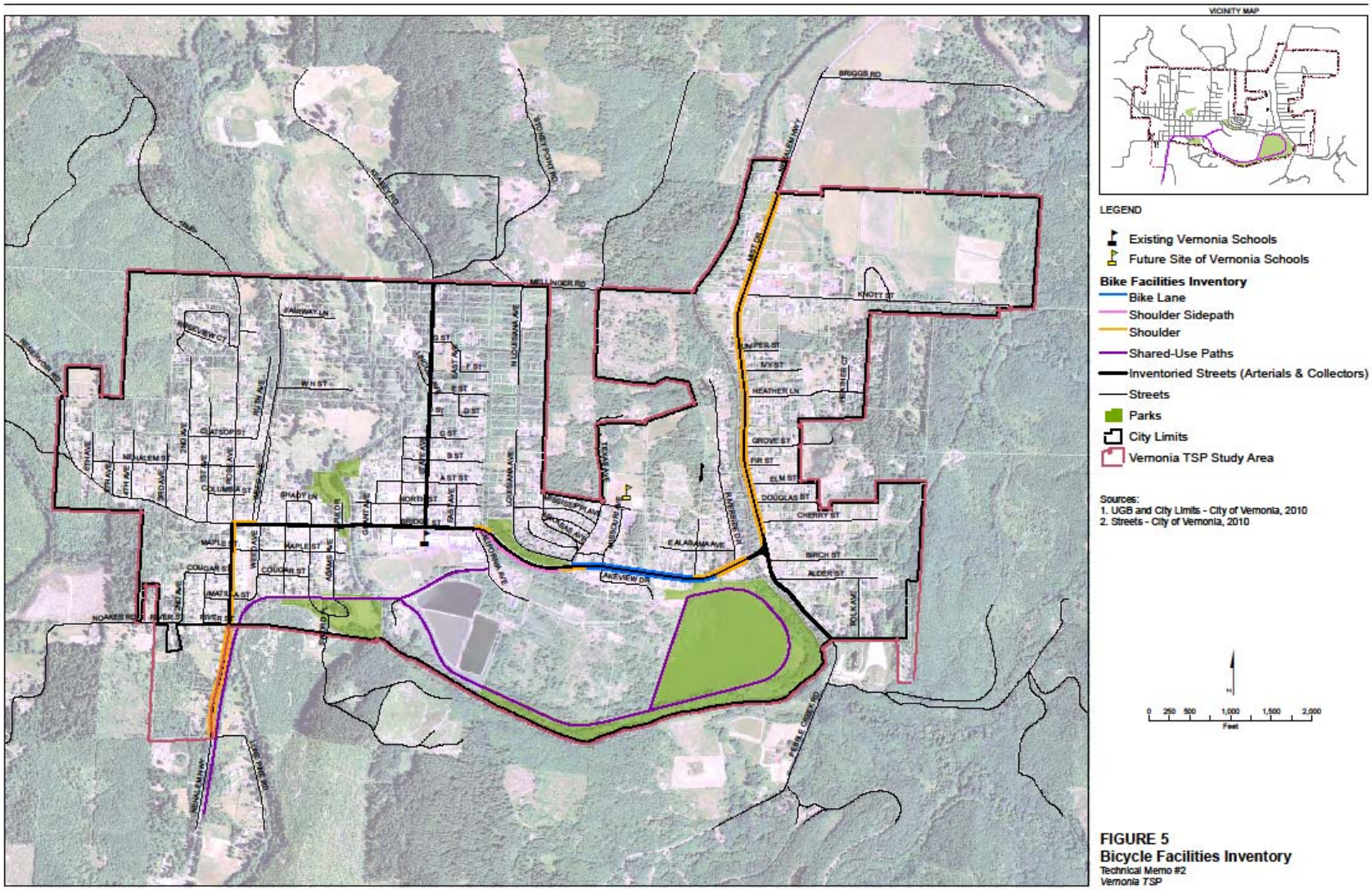


FIGURE 5
Bicycle Facilities Inventory
Technical Memo #2
Vernonia TSP

Existing Conditions - Pedestrian

- Downtown and adjacent streets have a connected network of sidewalks with pedestrian amenities.
- O-A Hill is the main obstacle to east-west pedestrian movement within Vernonia – a sidepath along the south side of OR 47 is the only option for pedestrians.
- There are very few sidewalks between O-A Hill and the Nehalem River.
- Mist drive north of Bridge Street does not have any dedicated pedestrian facilities.

Existing Pedestrian Facilities

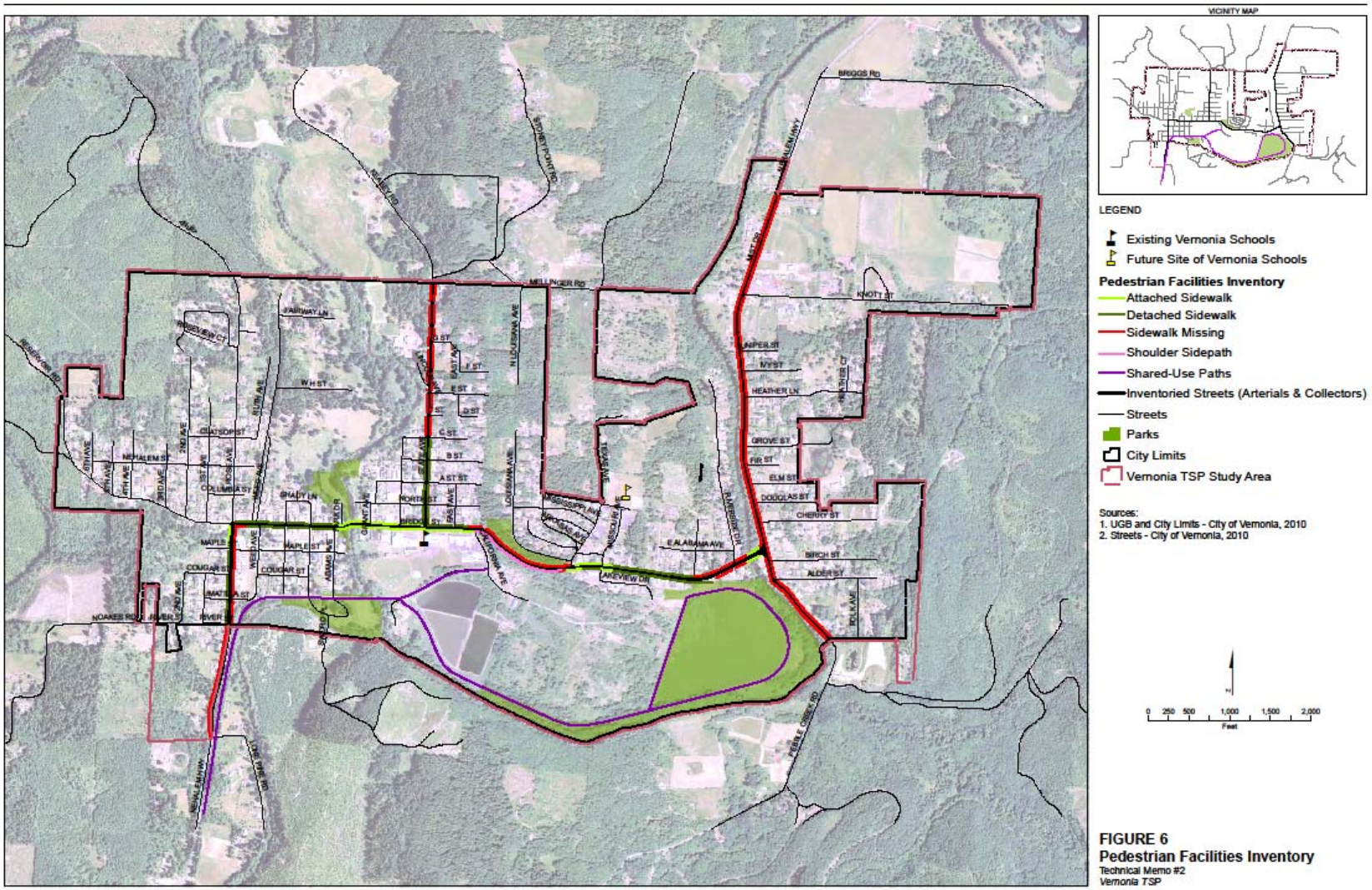


FIGURE 6
Pedestrian Facilities Inventory
Technical Memo #2
Vernonia TSP

CH2MHILL

Safe Routes to School

- Safe Routes to School programs use a variety of strategies to make it easy, fun and safe for children to walk and bike to school. These strategies are often called the “Four Es.”

- **Education**: programs designed to teach children about traffic safety, bicycle and pedestrian skills, and traffic decision-making.
- **Encouragement:** programs that make it fun for kids to walk and bike. These programs may be challenges, incentive programs, regular events (e.g. “Walk and Bike Wednesdays”) or classroom activities.
- **Engineering:** physical projects that are built to improve walking and bicycling conditions.
- **Enforcement**: law enforcement strategies to improve driver behavior near schools.

Safe Routes to School - Benefits

- Increased physical fitness and cardiovascular health
- Increased ability to focus on school
- A sense of independence and confidence about their transportation and their neighborhood
- Improved air quality as fewer children are driven to school
- Decreased crashes and congestion as fewer children are driven to school
- More community involvement as parents, teachers and neighbors get involved and put “eyes on the street”
- Fewer discipline problems because children arrive “ready to learn”
- Fewer private cars arriving to drop off and pick up children
- Opportunities to integrate walking, bicycling and transportation topics into curriculum (e.g. “Walk & Bike Across America,” mapping lessons, graphs and charts of distance walked or biked)

Safe Routes to School - Education

- Bicycle Rodeos

Safe Routes to School - Education

- Classrooms Lessons and Activities

Safe Routes to School - Encouragement

- Walk and Bike to School Day/Week/Month

Safe Routes to School - Encouragement

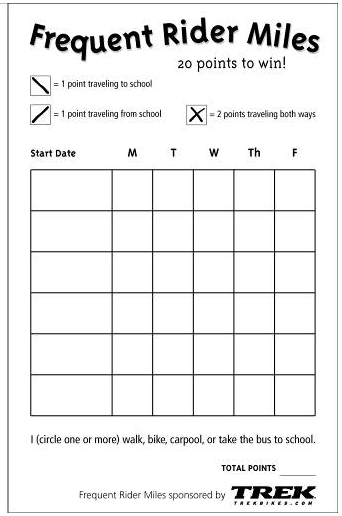
- Friendly Walking/Biking Competitions (Incentive Programs)

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**



Safe Routes to School - Encouragement

- Back to School Blitz

Safe Routes to School - Encouragement

- Stop and Walk

Safe Routes to School - Encouragement

- Walking School Buses

Safe Routes to School - Encouragement

- Bike Trains

Safer Routes to New School Site – Existing Conditions

- Access to the Missouri Avenue site from the east is challenged by missing sidewalks on Bridge Street (OR 47) east of Spencer Avenue, and a lack of bike lanes and ADA accessibility on the Nehalem River Bridge.

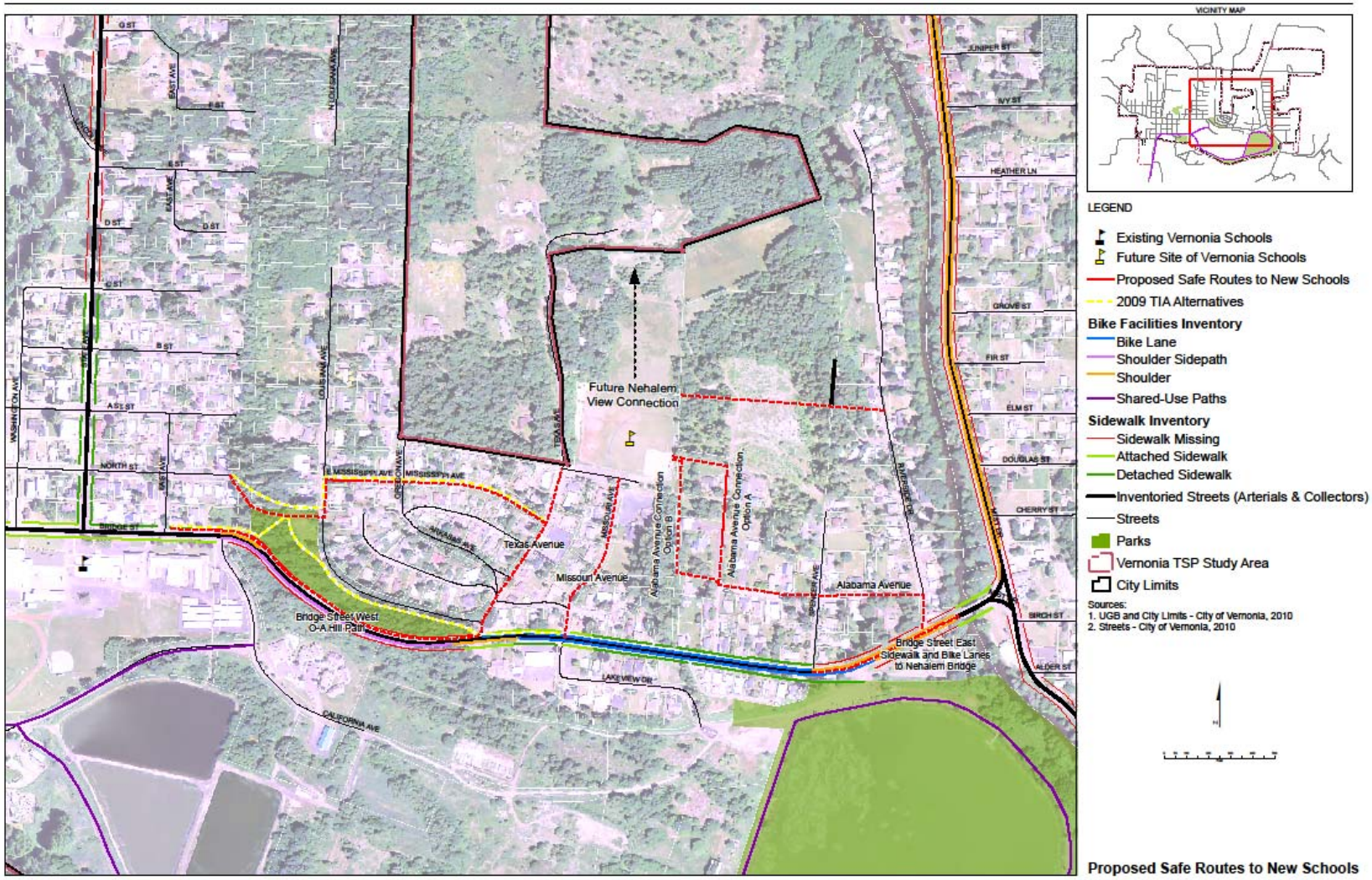
- The existing bicycle and pedestrian path on the southern shoulder of Bridge Street (OR 47) in the vicinity of O-A Hill is substandard, providing an obstacle to access to the Missouri Avenue site from the west.

- There are no existing sidewalks in the immediate neighborhood around the Missouri Avenue site.

Safer Routes to New School Site

- Half (50%) of students inside the Vernonia city limits currently walk or bike to school.
- Because students living west of O-A Hill represent over 70% of students who currently walk to school, an improved bicycle and pedestrian access across O-A Hill is essential to mitigate impacts on walking and bicycling that may be caused by the relocation of the schools site.

Existing and Potential Bicycle & Pedestrian Facilities



Thank You

Comment Form

Vernonia Transportation System Plan Update
Community Workshop – January 13, 2011

Welcome! Tonight's meeting is designed to:

1. Communicate the project purpose and goals
2. Solicit feedback on potential multimodal transportation improvements throughout Vernonia and along OR 47

Name: _____ Affiliation (if applicable): _____

Address: _____ City/State/Zip: _____

Email: _____

How did you hear about this meeting?

☐ Newspaper ☐ Project Flier ☐ Project Website ☐ Word of Mouth ☐ Other

(please describe): _____

Please tell us a little about yourself:

Do you live in: ☐ Vernonia? ☐ Elsewhere in Columbia County?
☐ Other? _____

We've presented project deficiencies and needs tonight. Are there additional transportation needs or deficiencies that you see in Vernonia?

_____

_____

_____

We've presented concepts for consideration to improve transportation along OR 47 and throughout the City of Vernonia: What do you think about these alternatives? Do you have any other suggestions for alternatives to consider?

(1) Safe Routes to New Schools:

_____

_____

_____

PLEASE TURN OVER

(2) Pedestrian and Bicycle Treatments:

_____

_____

_____

(3) Local road cross sections:

_____

_____

_____

(4) Collector road cross sections:

_____

_____

_____

(5) Potential High Build Alternatives:

_____

_____

_____

(6) Potential Low Build Alternatives:

_____

_____

_____

Please add any other comments here:

_____

_____

_____

Thank you for your feedback. Please fill out this comment form and give it to a staff member, put it in the comment box, or mail to:

Carole Connell, City of Vernonia,
1001 Bridge Street
Vernonia, OR 97064

Comments requested by Friday, January 21, 2011.

Vernonia Transportation System Plan Update
Community Workshop Summary

Thursday, January 13, 2011
5:30-8:30 p.m.
Vernonia Learning Center

This document provides a summary of the Vernonia Transportation System Plan Update Community Workshop held January 13th at the Vernonia Learning Center. The purpose of this open house was to review the work done to date, discuss the goals of the bicycle and pedestrian plan, and gather input on potential transportation alternatives. Approximately 10 people attended the meeting.

The format of the open house included a presentation at 5:45 followed by a question and answer period, and then an informal open house format for the remainder of the meeting (a second presentation was scheduled, but was given informally to one individual who did not attend the earlier presentation).

The Open House displays were organized into five areas:

- ***Welcome and sign in –*** a staff person at this station explained the format of the open house and distributed an informational handout describing the project background and draft recommendations.

- ***Project Overview –*** boards at this station included a project overview, goals, study area, project schedule, and who is involved.

- ***Key Findings –*** this station contained an overview display board describing current and future conditions and deficiencies within the City of Vernonia.

- ***Draft Recommendations –*** this station contained two boards showing potential street cross sections for both local and collector streets, and two boards for low and high-build alternatives. Community members were asked to vote via a sticker on the street cross section they preferred.

- ***Next Steps –*** this station described how comments from the public would be incorporated in the plan, and how the recommendations would be refined.

Presentation with Question and Answer

Mike Tresidder from Alta Planning and Design described potential safe routes to school programs and routes in a 15 minute presentation at 5:45. The presentation described existing bicycle and pedestrian conditions, potential bicycle and pedestrian improvements, and potential bicycle and pedestrian programs. Attendees had the opportunity to ask

questions following the presentation. The following paragraphs summarize questions heard from the audience.

One attendee asked about the potential for upgrading the Green Bridge, since it was identified as a pedestrian and bicycle choke point.

Currently the Green Bridge is not included in the Statewide Transportation Improvement Program (STIP), and the bridge itself is not considered to be deficient.

Another attendee asked about the opportunity to provide a link between the existing schools and the new schools, through the wetland and parkland that will be constructed on the old school site.

This led to a discussion about using California Avenue as a walking and biking route off of OR 47.

There was concern about the impact of increased traffic near the new school.

If more students walk or bike to the new school site, or participate in some of the programs that Mike discussed during his presentation, traffic to the new schools could be reduced.

A suggestion during the presentation was to reduce the speed limit on Mist to Knott. Currently it is 45 mph.

Road Cross-section Options

Of the people who attended the meeting, four placed voting stickers next to Option 2: two lane with parking and multi-purpose path, and three placed stickers by Option 3: Narrow street with multi-purpose path. Additionally, two notes were placed on the board; one suggested looking at local and collector right of way to help determine the best options for cross-sections. The second note commented that the path on option 2: two lanes with parking and multi-purpose path would need a curb or other separation.

For the collector road cross sections, four people like Option 2: Path on one side with curb, and three liked option 3: multi-use path and parking one side. Notes on Option 2 include: good alternative for California Avenue. Not great for any collectors because of speed and lack of safety on path. The second note says ODOT will require separation/buffer? It should be noted that there will be a curb between the path and the travel lane, and ODOT does not have jurisdiction on Collector Streets.

One note near Option 3 notes that speed is an issue on Rose (though the speed limit is 25 mph).

Safe Routes to New Schools

The board displaying potential routes to the new schools had a number of comments added to it during the meeting. These comments include:

- Possible separate bike/pedestrian bridge indicated near the existing Green Bridge
- Realign California Avenue to improve sight distance (connect to the east?)

- Stop and Walk at old school site? Using existing sidepath on Bridge Street. Stop and walks are areas where parents drop off school children, who then walk the remaining distance to school.
- Near O-A Hill, the following comment was added: Watershed Council, PCC Landscape Collaboration with School District on O-A Hill
- A couple of comments to staff members regarding the street cross sections included the need to provide a minimum and maximum cross section for both types of streets to fit in with the character of the neighborhoods, etc.
- Carole, the City Planner noted that most local road right of way is approximately 60 feet, and the local cross sections presented do not reflect this.

Potential High-Build Alternatives

The following comments were added to the potential high-build alternatives map:

- At the intersection of Rose and Bridge Street – insert a raised median and increased signage to indicate that the highway continues to the right. Channelize the intersection.
- At the intersection of Stoney Point Road and Keasey Road – Address the vertical curve.
- Near the alleyway between Mississippi Avenue and Arkansas Avenue, a note to continue the pedestrian path up O-A Hill along the alley – more direct for students
- Regarding connecting the C-Z trail to the Banks-Vernonia Trail:
  - The grade between where the C-Z trail comes into Vernonia and the connection to Knott Street (where the trail currently is meant to end) is very steep, with approximately a 15% slope in places.
  - The preferred route for the C-Z trail and the Banks-Vernonia trail is how it is shown on the high-build figure.
  - A secondary option is for the trail to come down Knott Street a bit and then south to the UGB limits
  - The river crossing is going to be a large barrier near the Nehalem River, and there are concerns with the constrained pedestrian and bicycle facilities on the Green Bridge.

Comment Form Responses

A comment form was given to attendees. Three people filled out the comment form and handed them in at the open house. One attendee is a full-time Vernonia resident, one was representing a Vernonia Resident, and the third person lives elsewhere in Columbia County. Most had heard of the meeting via the utility bill mailings or newspapers.

The following section summarizes comments from comment sheets submitted at the meeting, and conversations with meeting attendees.

In response to the question about additional transportation needs or deficiencies, the two responses included concern with the connectivity of the Banks-Vernonia Trail to the Scappoose-Vernonia Trailhead at the upper end of Knott Street. The other response is the ability for elderly to access places of business on Bridge Street via private car.

One commenter liked the trail connection shown on the high-build concept connecting the Banks-Vernonia trail to the future C-Z trail, citing the clear separation of pedestrians and bicyclists from cars and trucks along the highway.

Another commenter liked the idea of extending sidewalks along Bridge Street to Riverside Drive, and expressed concerns about conflicts between vehicles and pedestrians at the entrance into Lake Vernonia. With the relocation of the schools, the existing conflicts would increase.

Additional comments from the comment form included:

- Expand focus beyond "Safe routes to school" to include pedestrian and bicyclist tourism potential
- The biggest challenge is the cost of projects and the ability to find funding.

Welcome to the Vernonia Transportation System Plan Update Community Briefing

Please take a moment to:

- Sign in
- Provide feedback on transportation solutions
- Fill out a comment form

Tonight we will:

- Ask for your feedback on potential projects along OR 47 and throughout Vernonia
  - What do you like?
  - What don't you like?
- Discuss Safe Routes to New Schools

A brief presentation will be given at 5:30 and 6:30 p.m. on the project

Potential Roadway Cross-Sections

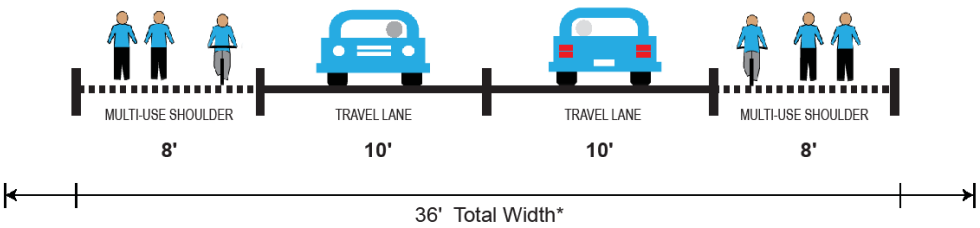
- The TSP update will include street cross sections by classification
- Please take some stickers and place them next to the cross section alternative you prefer for the local, collector, and arterial streets

Next Steps

- Draft the Transportation System Plan Update document (February-April)
- Community Briefing #2 – Present an overview of the Draft TSP Update (April)
- Planning Commission and City Council will review the draft plan and vote on adoption (June/July)

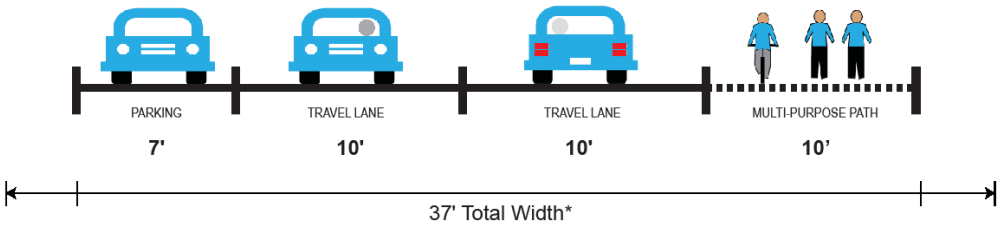
Local Road Cross Section Alternatives

OPTION 1: Two Lane with Shoulders



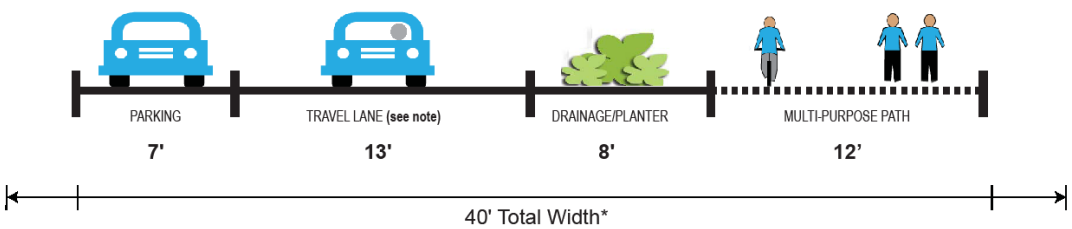
* 6' extra room

OPTION 2: Two Lane with Parking and Multi-Purpose Path



* 6' extra room

OPTION 3: Narrow Street with Multi-Purpose Path



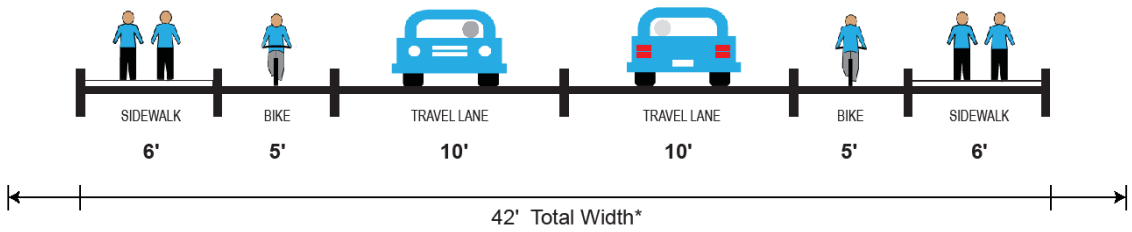
NOTE : Travel lane is too narrow for cars to pass side by side. Drivers will need to wait and pass each other when there are no cars in the parking lane.

* 6' extra room

Local roads include the “Tree Streets”, the “State Streets” (except Louisiana and State), and the numbered and lettered streets in Vernonia

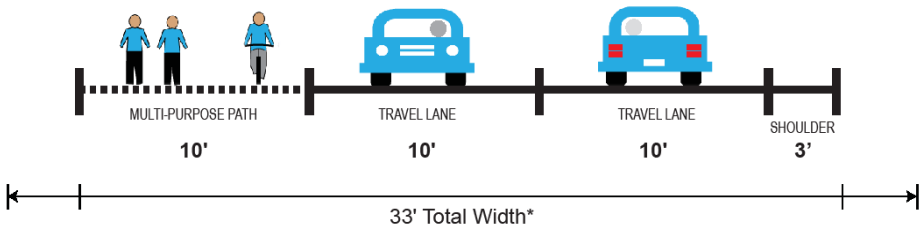
Collector Road Cross Section Alternatives

OPTION 1: Traditional Bike Lane/Curb



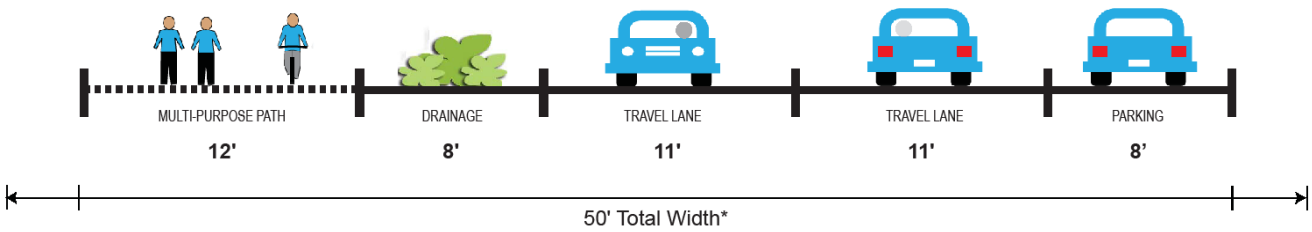
* 6' extra room

OPTION 2: Path on One Side with Curb



* 6' extra room

OPTION 3: Multi-use Path and Parking One Side

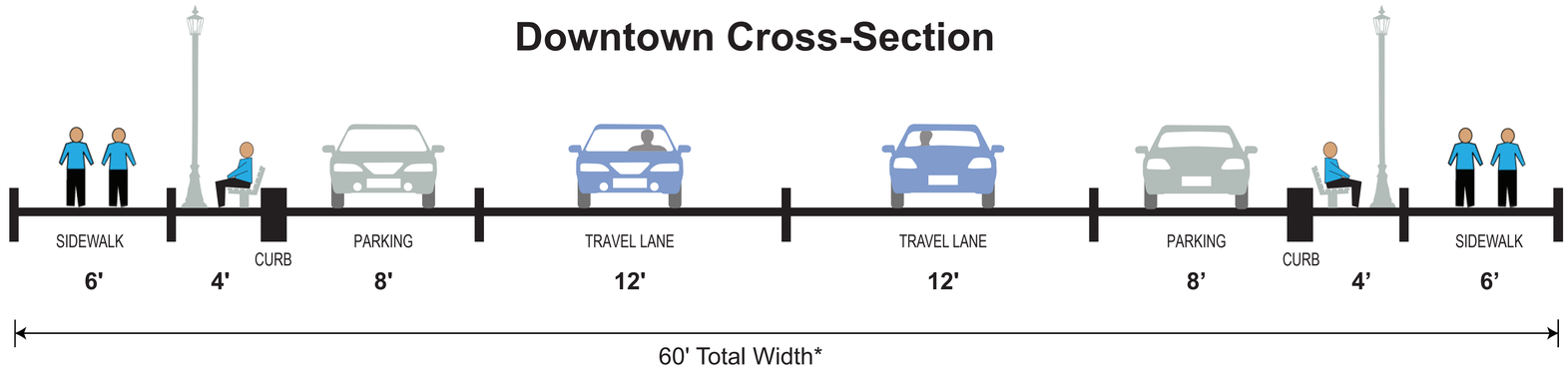


* 6' extra room

Collector roads include the following: Rose Avenue north of Bridge Street, Nehalem Street, State Avenue, Louisiana Avenue, Knott Street, and Cougar and 2nd Ave to Noakes Road.

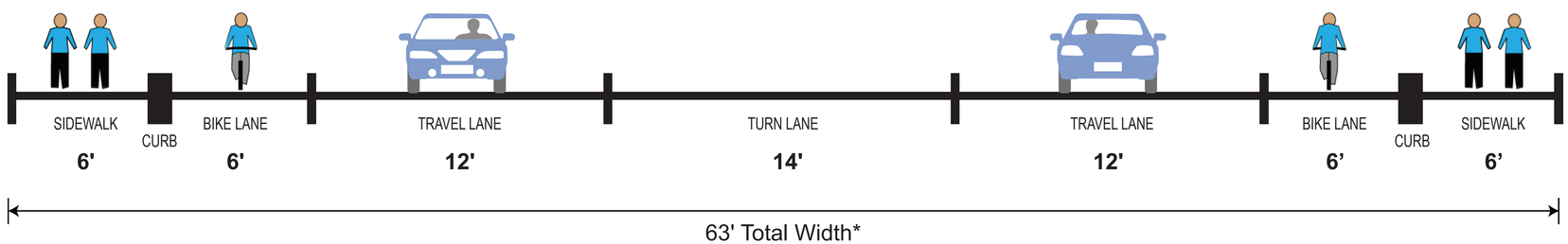
OR47 (Arterial Road) Range of Cross-Sections

Downtown Cross-Section



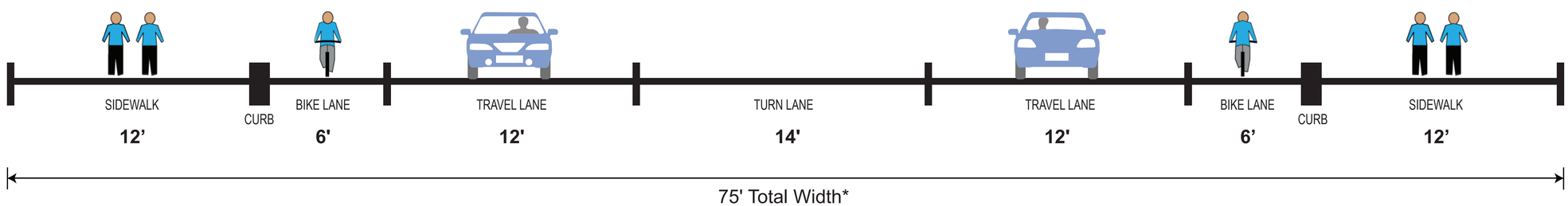
* 1' for curb

Minimum Cross-Section

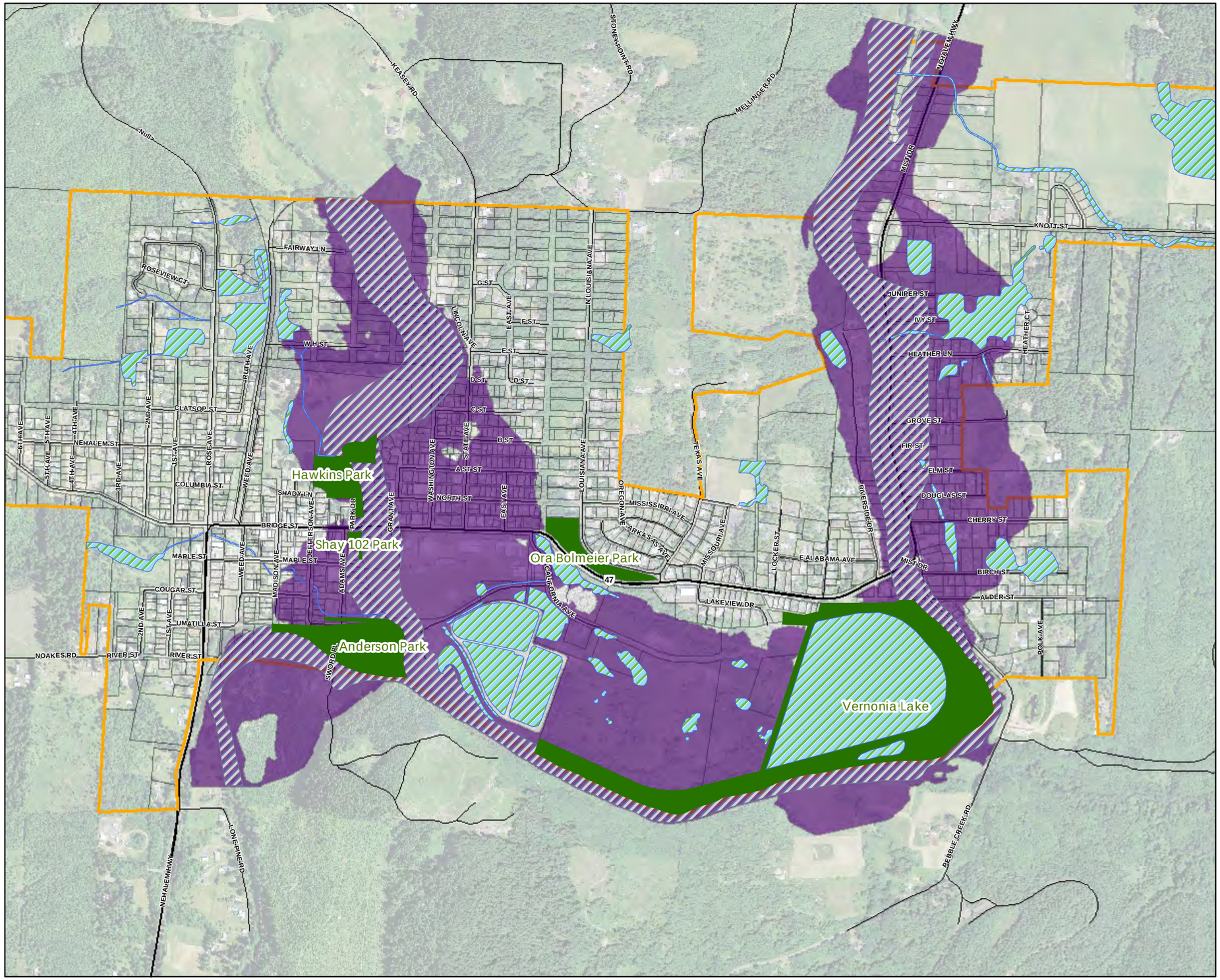


* 1' for curb

Maximum Cross-Section



* 1' for curb



VICINITY MAP

LEGEND

- Study Area
- LocalWetlandsInventory2001
- Parks
- State Highway
- Streets
- 100 year Floodway
- 100 Year Inundated
- LocalWetlandsInventory2001

N

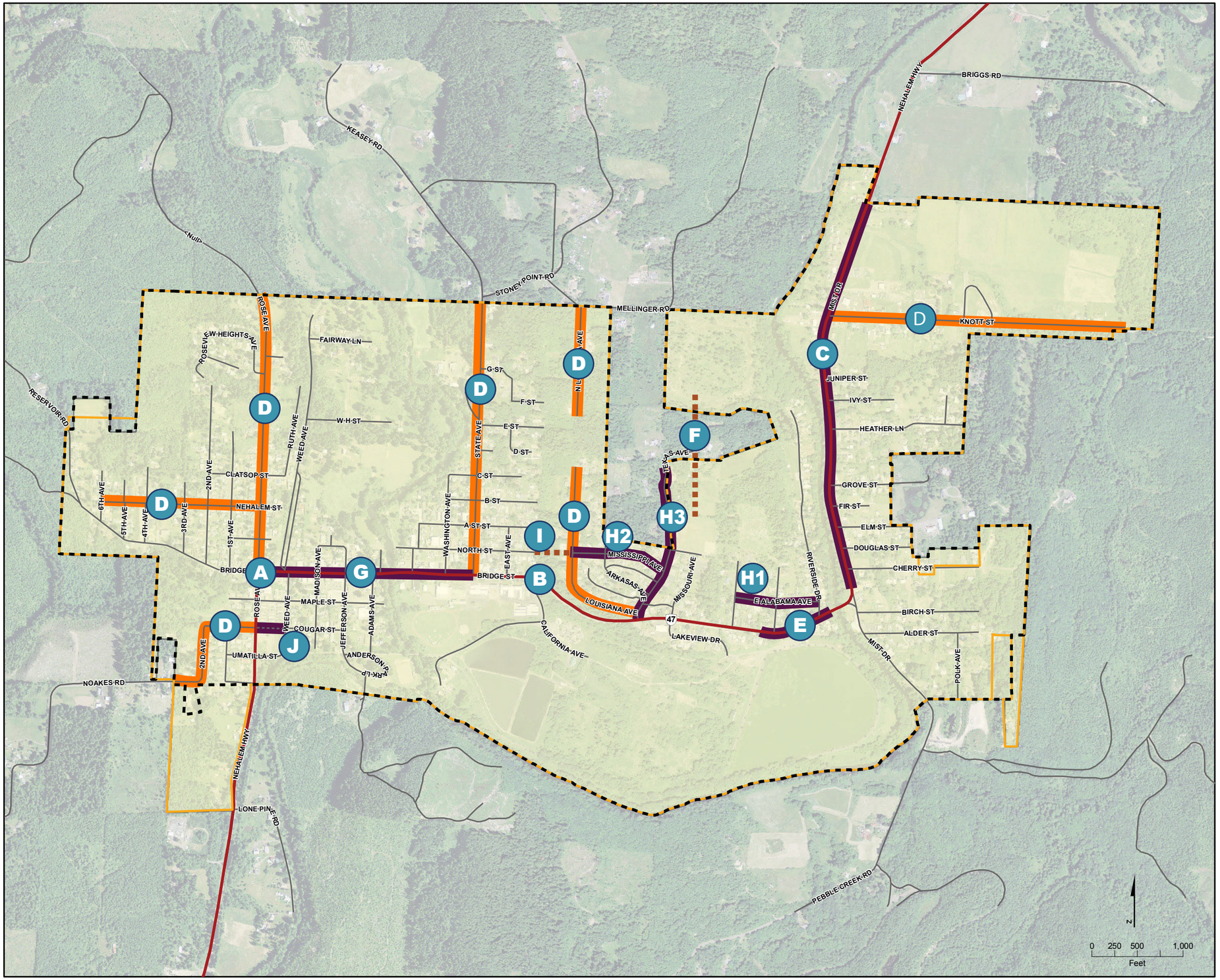
0 250 500 1,000
Feet

Goal 5 Resources

Vernonia Transportation System Plan
City of Vernonia, Oregon

CH2MHILL

\\ROSA\PROJ\ODOT\410377VERNON\GIS\MAPFILES\VERNONIATSP_WORKING.MXD CSTEBBIN 10/14/2010 17:22:32



VICINITY MAP

LEGEND

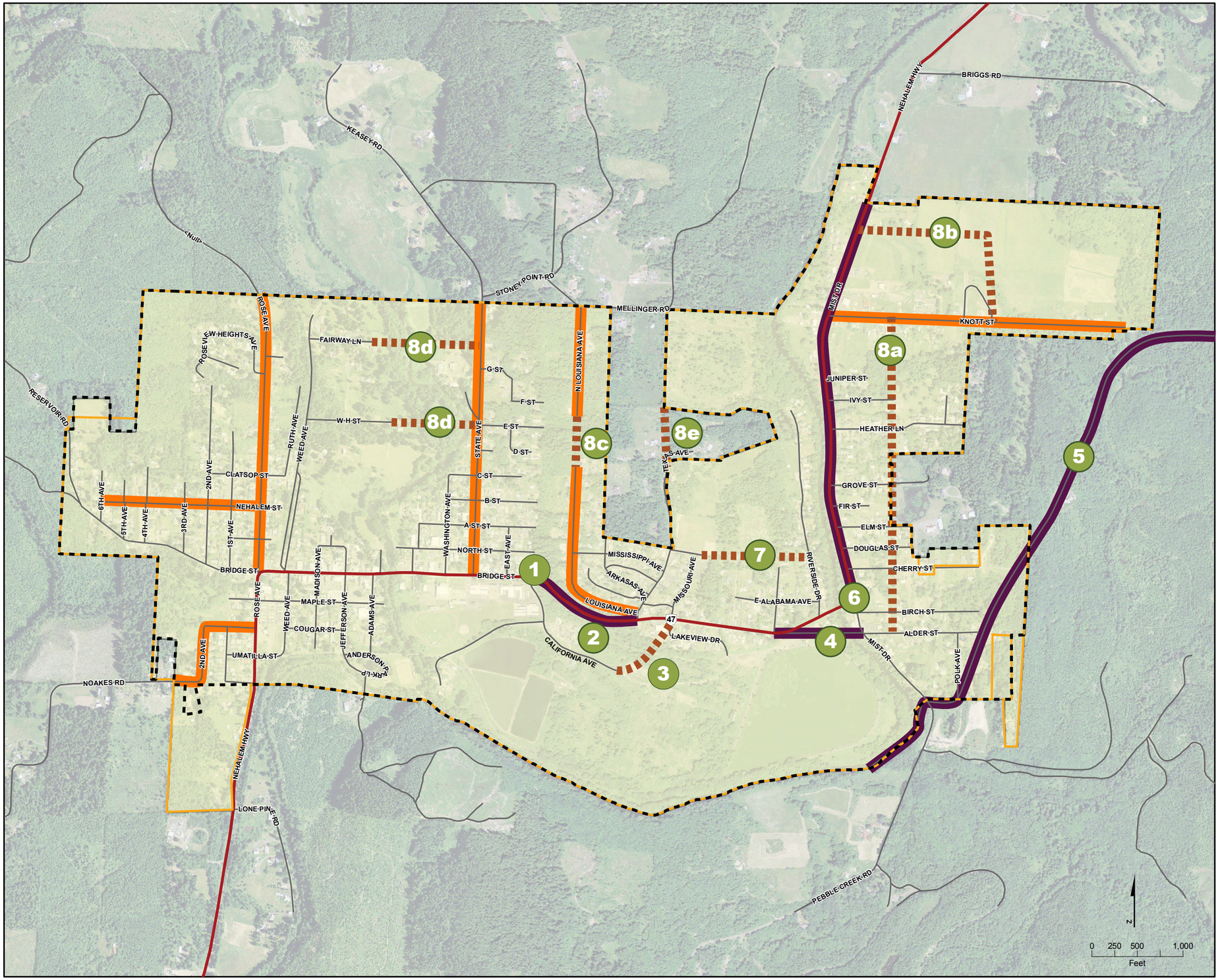
- State Highway
- Streets
- City Limits
- Urban Growth Boundary
- Study Area
- Collector Streets

- **A** Improve signage at OR47 and Rose Avenue.
- **B** Improve pedestrian crossing at OR47 to access the side path on O-A Hill.
- **C** Add sidewalk along OR47/Mist Drive (east side).
- **D** Add sidewalks or connect existing sidewalks along collector streets. Add bicycle facilities or shared lane markings.
- **E** Improve sight distance by clearing vegetation at intersections.
- **F** Add bicycle and pedestrian connection between new schools and future Nehalem View development.
- **G** Consider striping for no parking at corners in the downtown core to increase sight distance.
- **H** Safe routes to school connection improvements (on Alabama Avenue, Mississippi Avenue, and Texax Avenue)
- **I** Soft-surface trail improvements up O-A Hill
- **J** Extend Cougar East of Rose Avenue as a collector street

Low-Build (Short Term) Options

Vernonia Transportation System Plan

City of Vernonia, Oregon



VICINITY MAP

LEGEND

- State Highway
- Streets
- City Limits
- Urban Growth Boundary
- Study Area
- Collector Streets
- Recommended Street Connections
- 1 Widen OR47; add bicycle/pedestrian path on both sides.
- 2 Shift OR47 to the south to make room for a bicycle/pedestrian path north of the highway.
- 3 California Avenue to connect to Missouri Avenue
- 4 Realign Bridge Street to meet Mist Drive; keep the Green Bridge for bicycles and pedestrians. Build missing sidewalks along Bridge Street.
- 5 Connect future Crown-Zellerbach Trail to the Banks-Vernonia Trail.
- 6 Reconfigure the Mist Drive/Bridge Street intersection.
- 7 Create a bicycle and pedestrian connection to the new school from Riverside Drive.
- 8 Potential connectivity improvements.

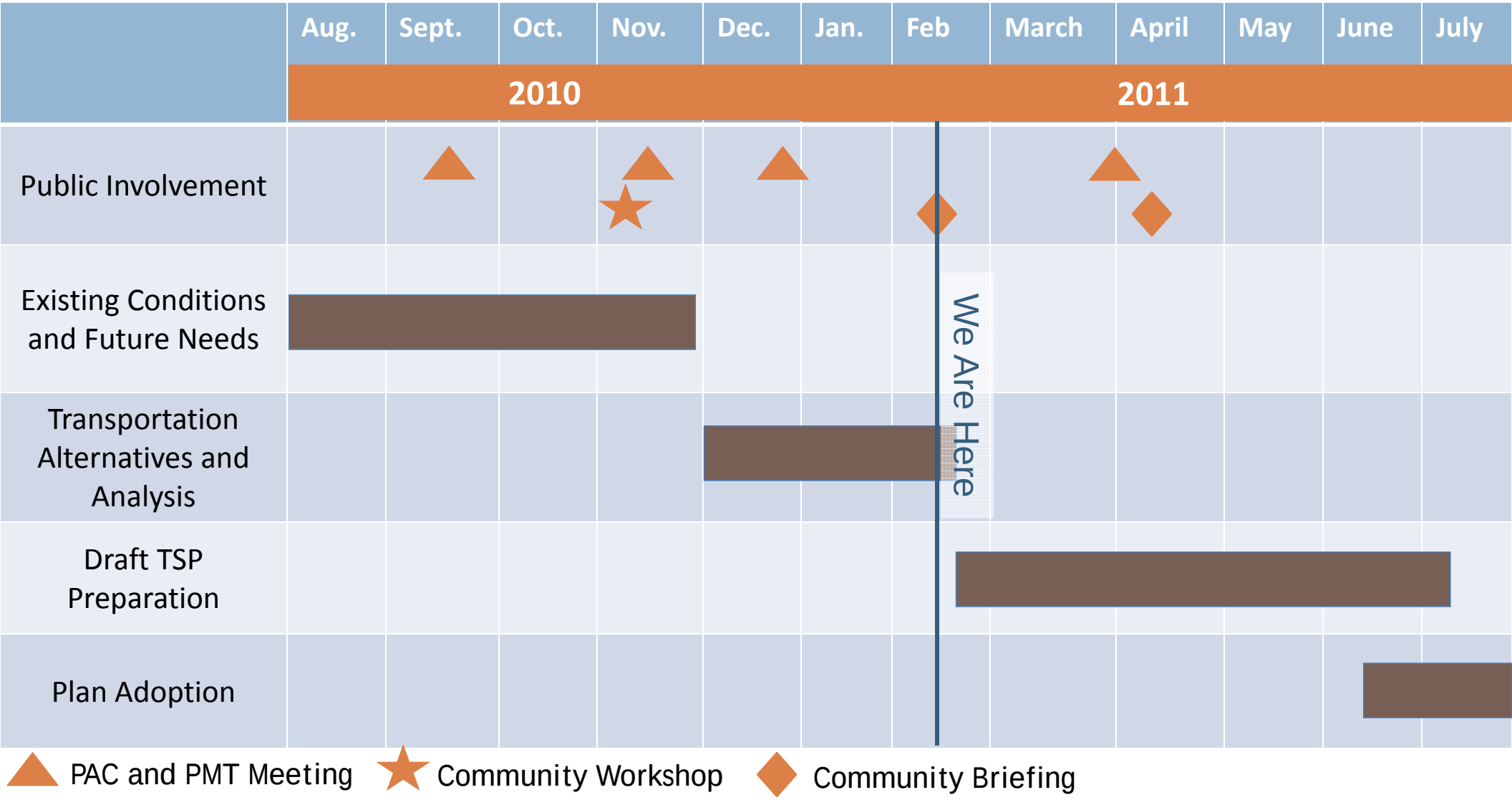
Note: Location of street and path connections are approximate and subject to design review process and environmental considerations

High-Build (Long Term) Options

Vernonia Transportation System Plan

City of Vernonia, Oregon

Vernonia Transportation System Plan Update Schedule



Vernonia Transportation System Plan Update Community Briefing #2

Tonight we will:

- Present recommended projects to improve the Transportation System in Vernonia
- Talk about implementation and project priorities

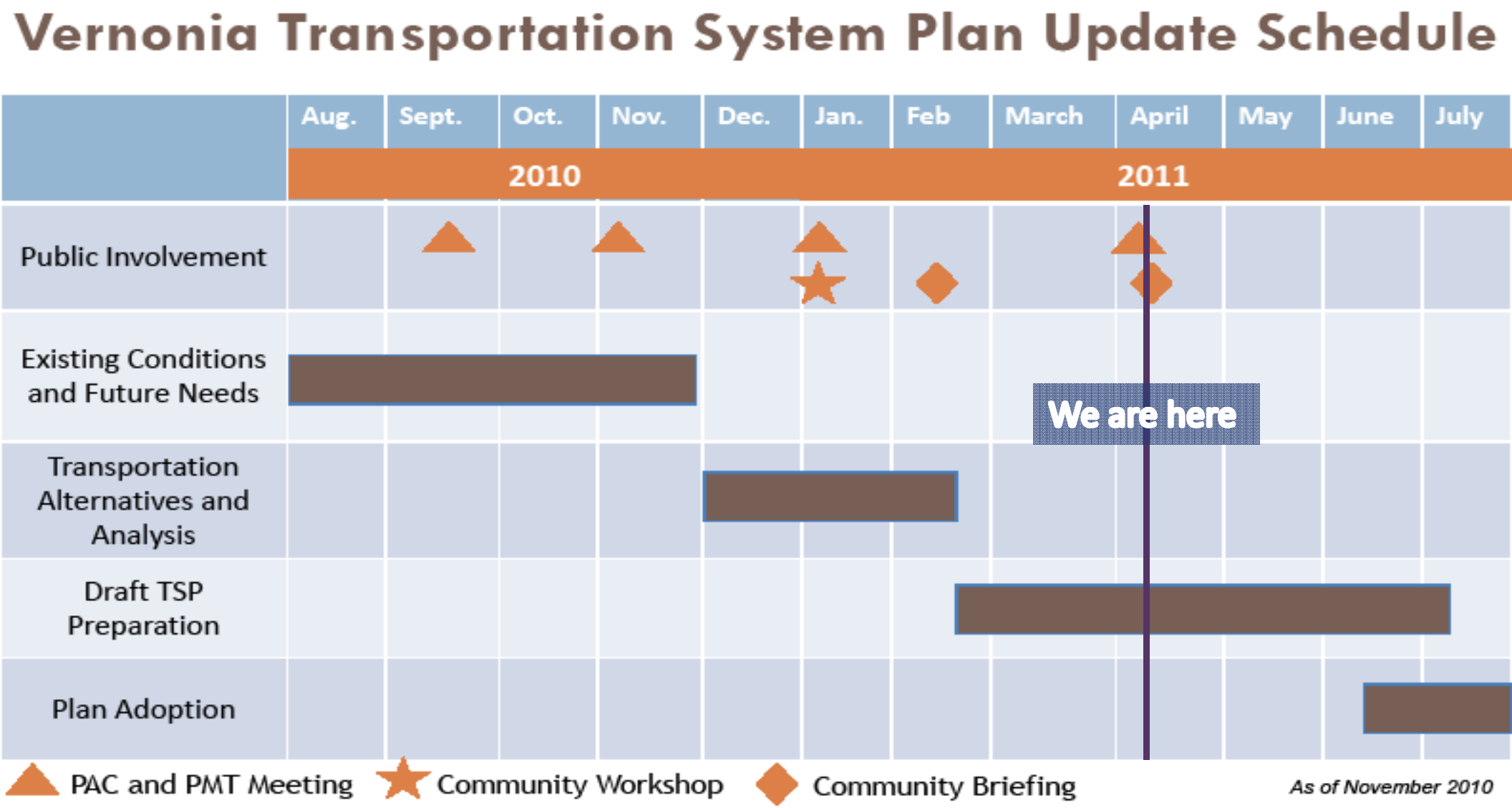
Project Background

- This Transportation System Plan (TSP) Update will add recent information to the City's 1999 TSP
- This is a long-term (20 year) plan to identify:
  - Safe Routes to new schools
  - Bicycle improvements
  - Pedestrian Improvements
  - Safety improvements

Who is involved?

- The City of Vernonia
- Oregon Department of Transportation
- Columbia County
- Oregon Department of Land Conservation and Development
- The Vernonia Community
- Planning consultants:
  - CH2M HILL
  - Alta Planning + Design

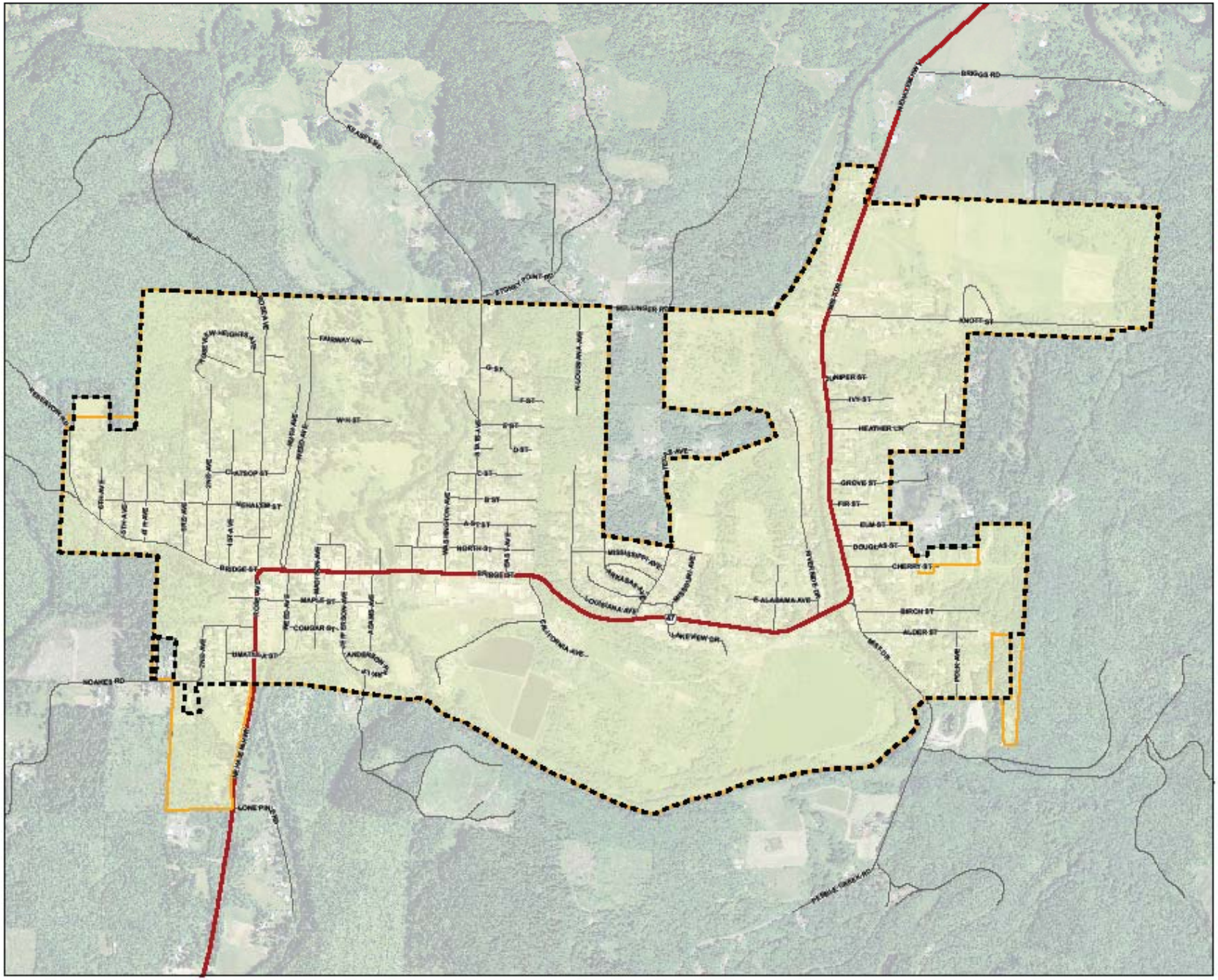
Schedule


Vernonia Transportation System Plan Update Schedule
Aug.
Sept.
Oct.
Nov.
Dec.
Jan.
Feb
March
April
May
June
July
2010
2011
Public Involvement
Existing Conditions and Future Needs
We are here
Transportation Alternatives and Analysis
Draft TSP Preparation
Plan Adoption
PAC and PMT Meeting
Community Workshop
Community Briefing
As of November 2010

Project Goals

- Operation and Safety
  - Preserve and improve function, capacity, and level of service and safety of the roadway system
- Transportation Alternatives
  - Support use of other modes, especially bicycles and pedestrians, including transit
  - Support Safe Routes to Schools programming and projects
  - Receive input on airport operations and expansion
- Finance
  - Sound fiscal approach to financing transportation system improvements

Project Study Area



LEGEND

- State Highway
- Streets
- City Limits
- Urban Growth Boundary
- Study Area

0 250 500 1,000
Feet

Study Area
Vernonia Transportation System Plan
City of Vernonia, Oregon

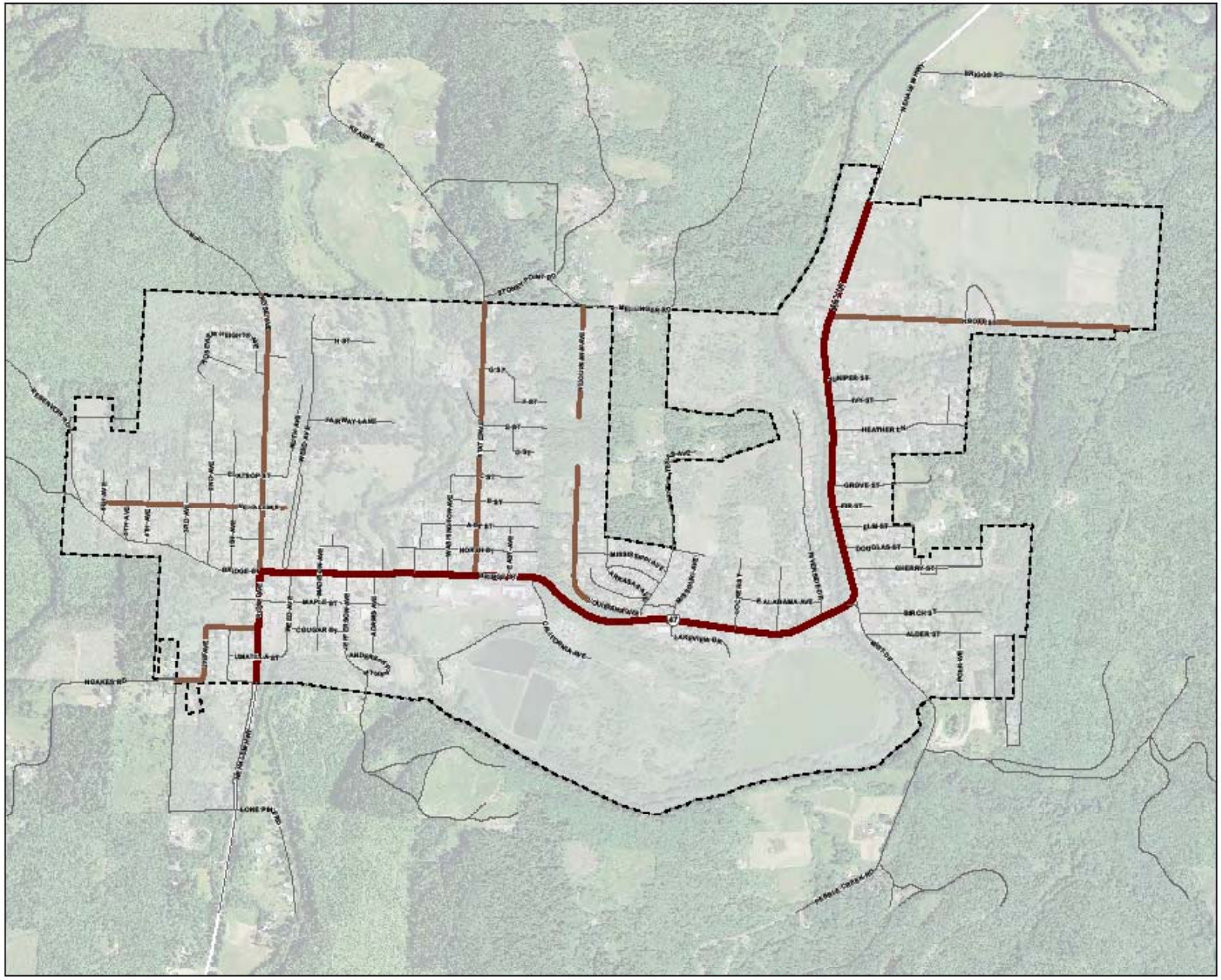
WRGBAIPROJ\ODOT\410377\VERNONIA\GIS\MAPFILES\FIGURE_1_STUDYAREA.MXD EDURBA 10/22/2010 10:19:17

Findings to Date

- All study area intersections operate within State and City standards
- There are limited and disconnected sidewalks throughout Vernonia
- O-A Hill is an obstacle to east-west pedestrians within Vernonia
- There are only a few bicycle lanes along OR 47
- Cyclists share travel lanes over the Rock Creek and Nehalem River Bridges

Functional Classification

- Different roadway classifications serve different trip purposes.
- Functional Classifications guide appropriate roadway standards
- There are three types of roadways in Vernonia: Local, Collector and Arterial



LEGEND

City Limits

Study Area

Vernonia Street Classification

Arterial

Collector

Local

Sources:
1. UGB and City Limits - City of Vernonia, 2010
2. Streets - City of Vernonia, 2010

N

0 250 500 1,000
Feet

Functional Classification System

Vernonia Transportation System Plan
City of Vernonia, Oregon

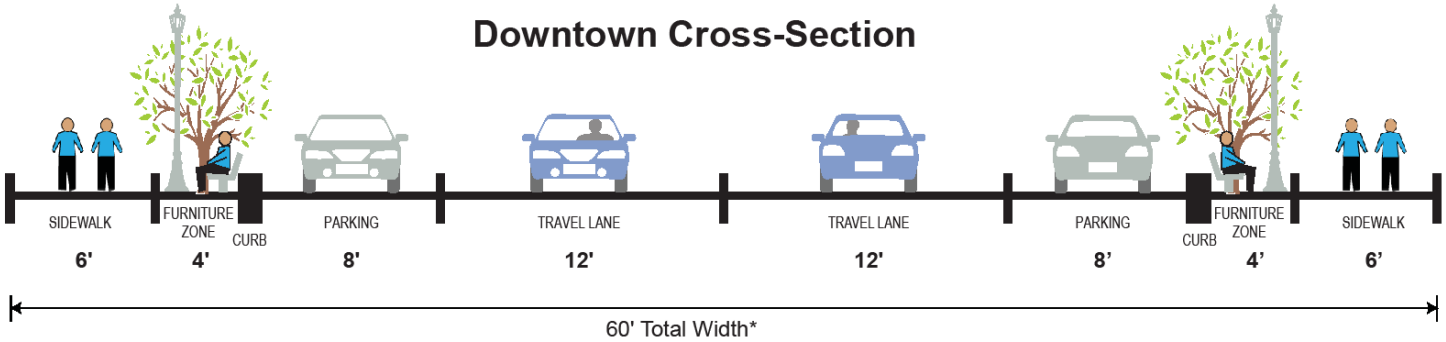
\\ROSA\PROJ\ODOT\410377\VERNON\GIS\MAPFILES\FIGURE_1_STUDYAREA.MXD EDKJRBA 10/22/2010 10:19:17

Recommended Roadway Cross-Sections

- The City has a variety of available right-of-way widths
- The recommended cross-sections provide a range of options based on available room

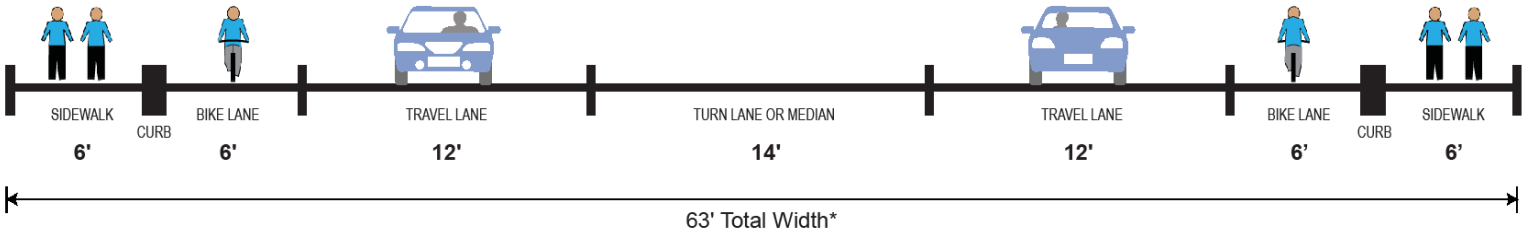
OR47 (Arterial Road) Range of Cross-Sections

Downtown Cross-Section



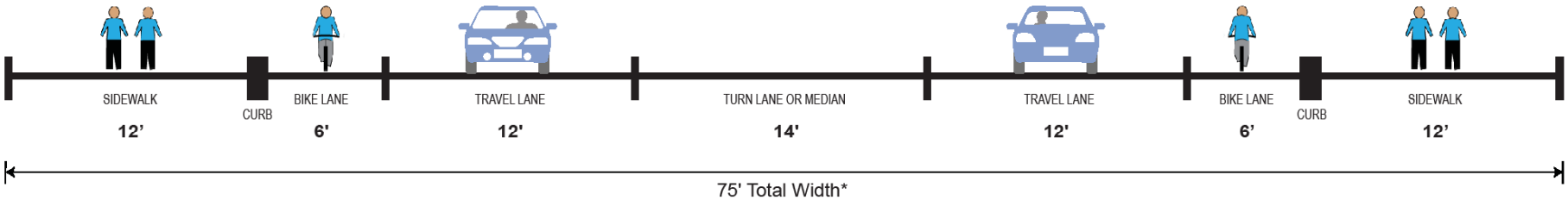
* 1' for curb

Minimum Cross-Section



* 1' for curb

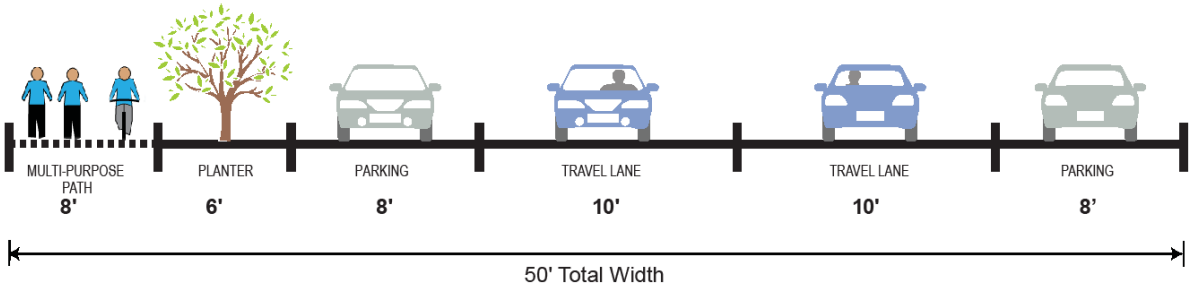
Maximum Cross-Section



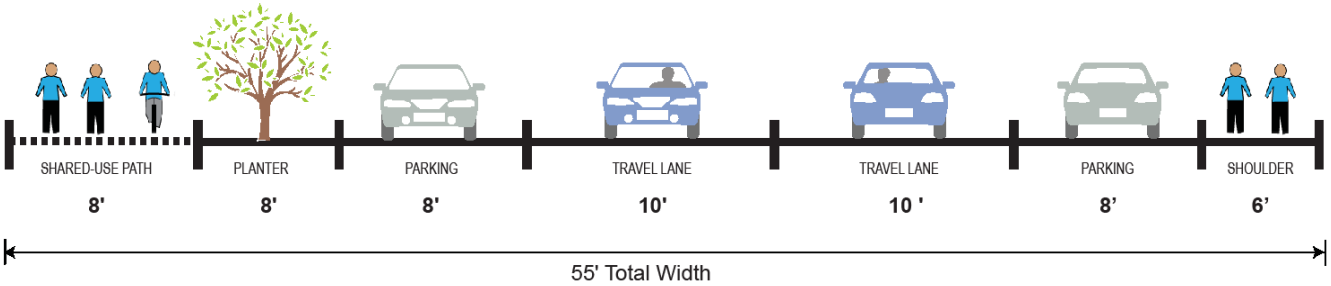
* 1' for curb

Range of Collector Road Cross-Sections

Minimum Cross-Section: Shared-Use Path on One Side



Maximum Cross-Section: Pedestrian Facilities and Parking on Both Sides

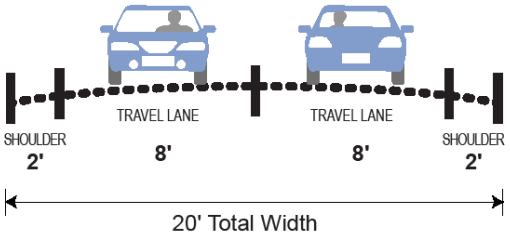


Collector Streets are:

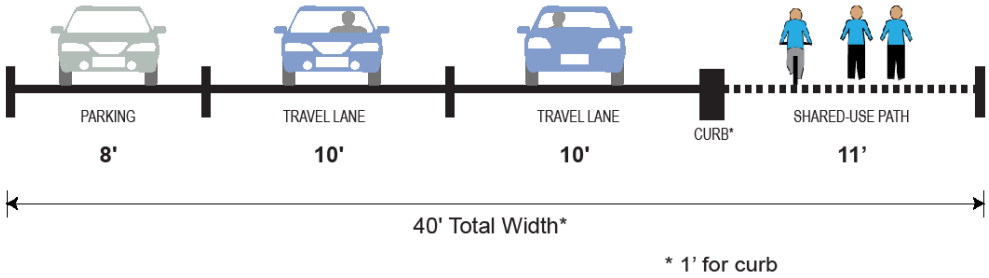
- Rose Ave (North of Bridge St), 75' ROW
- Nehalem St (West of Rose Ave), 50' ROW
- State Ave, 50' ROW
- Louisiana Ave (South Segment), 50' ROW
- Louisiana Ave (North Segment), 60' ROW
- Knott St, 60' ROW
- Cougar St (West of Rose Ave), 60' ROW

Range of Local Road Cross-Sections

Minimum Cross-Section: Gravel

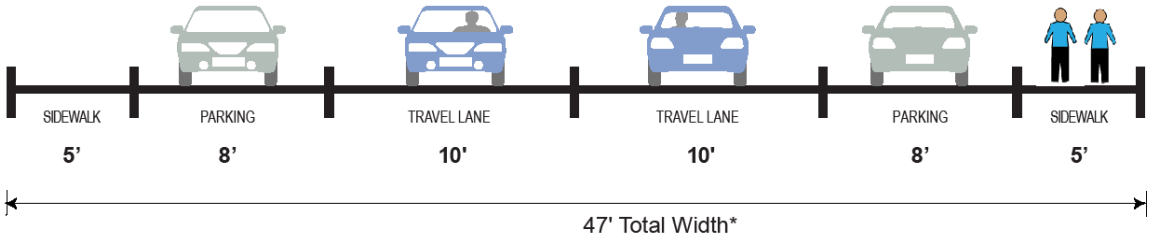


Intermediate Cross-Section: Shared Use Path with Curb, Parking One Side



NOTE:
On local streets, bicycles are assumed to be able to share the travel lane or the shared-use path.

Maximum Cross-Section: Sidewalk and Parking Both Sides



* Also an option for a wide path and planter on one side

Project Recommendations

- To fit the structure of the Existing TSP, the recommendations were split into two categories:
  - Roadway Recommendations
  - Bicycle and Pedestrian Recommendations

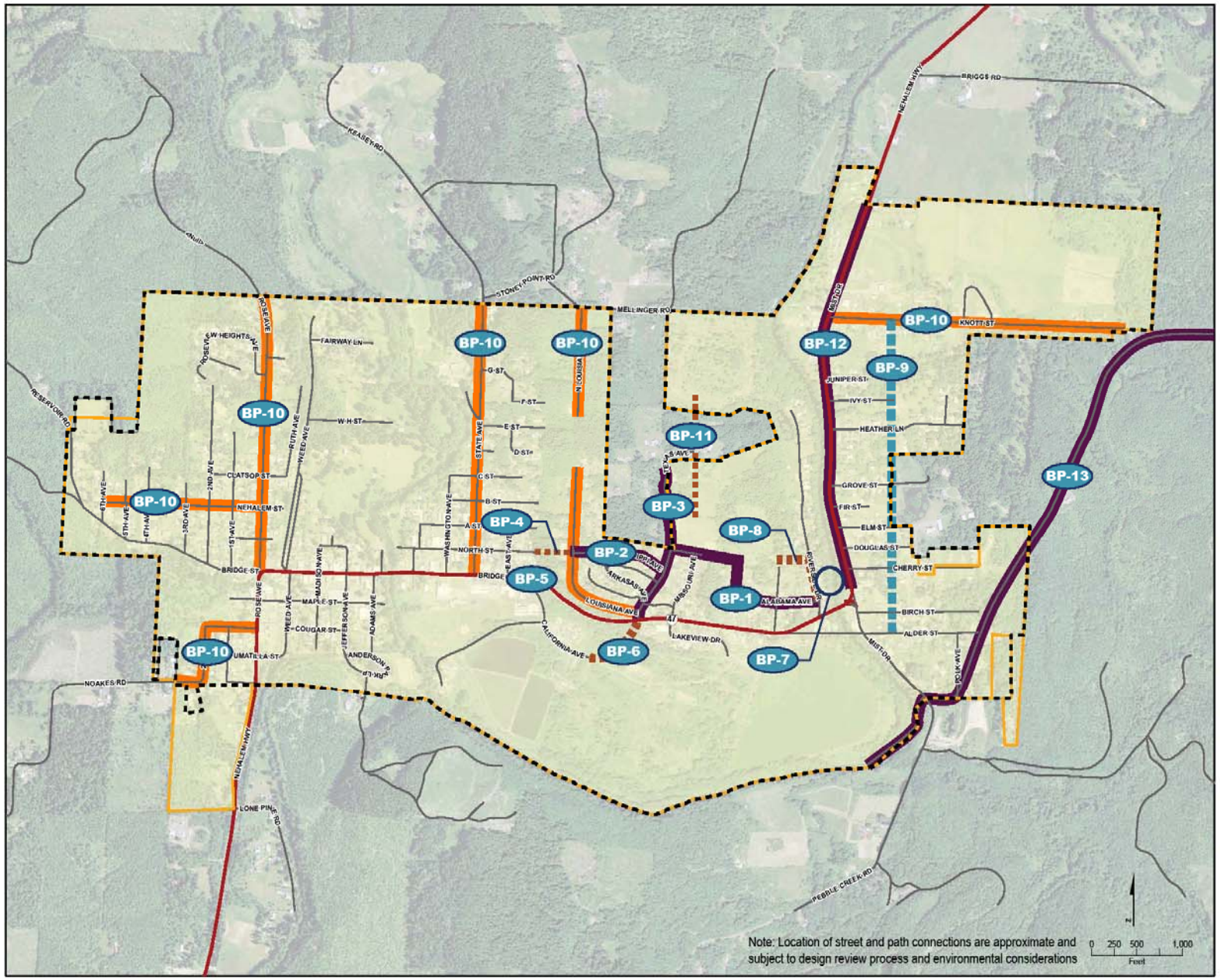
LEGEND

- State Highway
- Streets
- City Limits
- Urban Growth Boundary
- Study Area
- Collector Streets
- Recommended Street Connections
- RD-1 Improve signage at OR47 and Rose Avenue
- RD-2 Widen OR47; add bicycle/pedestrian path on both sides
- RD-3 Reconfigure the Mist Drive/Bridge Street intersection
- RD-4 Restrict parking at corners on OR47
- RD-5 East-West road connection north of Knott Street
- RD-6 Connect Louisiana Avenue
- RD-7 Extend Texas Avenue to Mellinger Road

Note: Location of street and path connections are approximate and subject to design review process and environmental considerations

Roadway Projects
Vernonia Transportation System Plan
City of Vernonia, Oregon

TBG0419112035 32PDX_041911_01



LEGEND

- State Highway
- Streets
- City Limits
- Urban Growth Boundary
- Study Area
- Collector Streets
- Recommended Bicycle and Pedestrian Path Connections
- Linear Park/Trail Through City-Owned Properties
- BP-1 Safe routes to school connection – Alabama Ave.
- BP-2 Safe routes to school connection – Mississippi Ave.
- BP-3 Safe routes to school connection – Texas Ave.
- BP-4 Soft-surface trail improvements up O-A Hill. Exact location to be determined.
- BP-5 Improve pedestrian crossing at OR47 to access the side path on O-A Hill. Exact location to be determined.
- BP-6 Pedestrian and bicycle connection between California and Missouri Avenues.
- BP-7 Dedicated bicycle/pedestrian bridge over the Nehalem River.
- BP-8 Bicycle/pedestrian connection – new schools to Riverside Drive.
- BP-9 Linear north-south trail connecting the "Tree Streets".
- BP-10 Add sidewalks or connect existing sidewalks along collector streets. Add bicycle facilities or shared lane markings.
- BP-11 Add bicycle and pedestrian connection between new schools and future Nehalem View development. Exact location to be determined.
- BP-12 Add sidewalk along OR47/Mist Drive (east side).
- BP-13 Connect future Crown-Zellerbach Trail to Banks-Vernonia Trail.

Bicycle and Pedestrian Projects

Vernonia Transportation System Plan

City of Vernonia, Oregon

TBG041911203532PDX_041911_01

Action Plan – Roadway Projects

	Improvement	Cost Estimate (2011 $)	Timeframe
RD - 1	Improve signage at OR 47 and Rose Avenue	$10,000	Short
RD – 2	Widen OR 47, add bicycle and pedestrian path on both sides	$8,463,000	Medium
RD – 3	Reconfigure the Mist Drive/Bridge Street intersection	$369,000	Medium
RD – 4	Bridge Street signing and Striping, potential bioswales, concrete bumps or curb bulb-out extensions. There are a total of 7 corners in the downtown core that would be eligible for this treatment.	$13,000-$15,000 each corner	Medium
RD – 5	Add an east-west local street north of Knott Street to provide additional access to the light industrial parcel east of Mist Drive/OR 47	$2,647,000	Long
RD – 6	Connect the north and south sections of Louisiana Avenue	$358,000	Long
RD – 7	Connect Texas Avenue to Mellinger Road at the north of the City's UGB	$1,445,000	Long

Action Plan – Bicycle and Pedestrian Projects

	Project	Cost Estimate	Time Frame
BP -1	Safe Routes to School Connection – Alabama Avenue	$150,000	Short
BP -2	Safe Routes to School Connection – Mississippi Avenue	$110,000	Short
BP -3	Safe Routes to School Connection – Texas Avenue	$80,000	Short
BP -4	Soft-Surface Trail Improvements up O-A Hill	$60,000	Short
BP -5	Improve Pedestrian Crossing on OR 47/Bridge Street to Access O-A Hill Sidepath	$50,000	Short
BP -6	Pedestrian and Bicycle Connection between California Avenue and Missouri Avenue	$450,000	Medium
BP -7	Create a bicycle/pedestrian bridge over the Nehalem River in the vicinity of Alabama Avenue.	$1,689,000	Medium
BP -8	Create a Bicycle/Pedestrian Connection to the New Schools from Riverside Drive	$230,000	Medium
BP -9	Add a pedestrian/bicycle trail north-south east of Mist Drive/OR 47 to connect the “tree streets”	$452,000	Medium
BP -10	Construct Sidewalks and Bicycle Facilities on Collector Streets	$5,480,000	Medium/Long
BP -11	Bicycle/Pedestrian Connection From Vernonia Schools to Nehalem View Development	$210,000	Medium/Long
BP -12	Construct Sidewalk Along OR 47/Mist Drive	$750,000	Long
BP -13	Connect Future Crown-Zellerbach Trail to Banks-Vernonia Trail	$1,710,000	Long

Funding Options

There are a variety of funding options to help fund the TSP projects:

- ODOT
  - Transportation Enhancement
  - Bicycle and Pedestrian Program
  - Operations (Signs and illumination)
  - Highway Safety Improvement Program
  - Modernization Program
- Other State sources
  - Community Development Block Grant
  - State Parks Recreational Trails Grant
  - Urban Trails Fund
  - Land and Water Conservation Fund
- Local Sources
  - Local Improvement District (LID)
  - Developer Contributions
  - Street Improvement Bond

Next Steps

- Incorporate comments from Community Briefing #2 and PAC and PMT meeting (April)
- Planning Commission and City Council Worksession (May)
- Planning Commission and City Council will review the draft plan and vote on adoption (June/July)

Comment Form

Vernonia Transportation System Plan Update

Community Briefing – April 20, 2011

Welcome! Tonight's meeting is designed to:

1. Provide information on the implementation of projects for the Vernonia TSP update
2. Solicit feedback on priorities, time frame, and implementation of TSP update projects

Name: _____ Affiliation (if applicable): _____

Address: _____ City/State/Zip: _____

Email: _____

How did you hear about this meeting?

☐ Newspaper ☐ Project Flier ☐ Project Website ☐ Word of Mouth ☐ Other

(Please describe): _____

Please tell us a little about yourself:

Do you live in: ☐ Vernonia? ☐ Elsewhere in Columbia County?
☐ Other? _____

We've presented projects to improve transportation along OR 47 and throughout the City of Vernonia: What do you think about these projects?

1. Roadway Projects (RD -1 through RD – 7)

_____

_____

_____

_____

2. Bicycle and Pedestrian Projects (BP -1 through BP – 13)

_____

_____

_____

_____

PLEASE TURN OVER

3. Collector road cross sections:

_____

_____

_____

_____

4. Arterial road cross sections:

_____

_____

_____

_____

5. High Build Alternatives:

_____

_____

_____

_____

6. Low Build Alternatives:

_____

_____

_____

_____

Please add any other comments here:

_____

_____

_____

_____

Thank you for your feedback. Please fill out this comment form and give it to a staff member, put it in the comment box, or mail to:

Carole Connell, City of Vernonia,
1001 Bridge Street
Vernonia, OR 97064

Comments requested by Friday, April 29, 2011.

Planning Commission and City Council Worksessions

To ensure that the Planning Commission and City Council were up to date on the TSP update throughout the process, there were two worksessions to describe the TSP update and the potential changes to the City's Comprehensive Plan and Zoning Ordinance.

Date	Purpose
March 3, 2011	Worksession #1: Discuss potential projects, and Safe Routes to Schools Recommendations
May 5, 2011	Worksession #2: Present recommended prioritized projects, identify funding sources, and draft amendments to the City's land use regulations, review draft implementation ordinance for adoption

Included below are the presentation given at both City Council and Planning Commission worksessions.

Vernonia Transportation System Plan Update City Council and Planning Commission Worksession

Tonight we will:

- Present potential projects to improve the Transportation System in Vernonia
- Present Safe Routes to Schools Recommendations

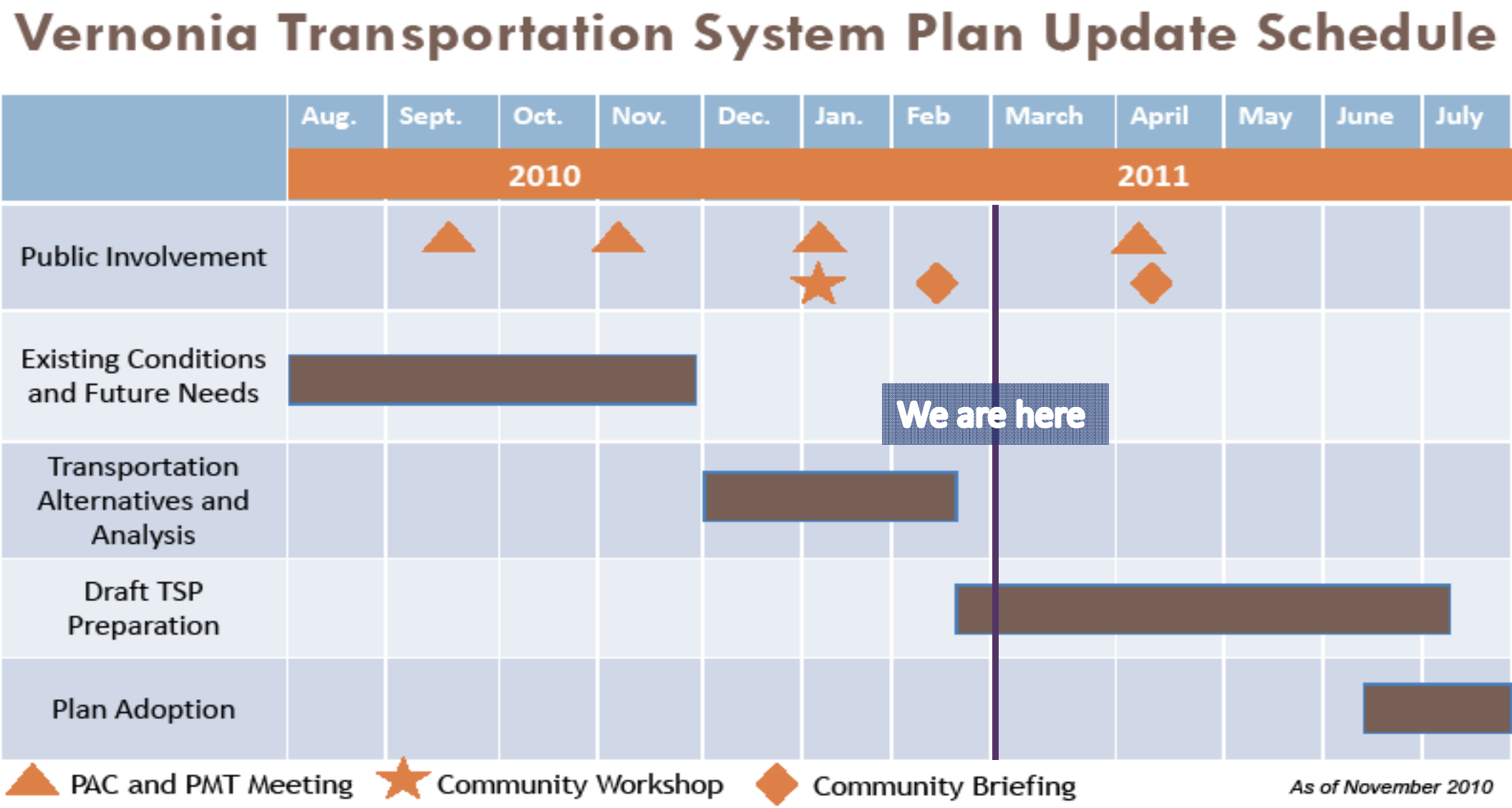
Project Background

- This Transportation System Plan (TSP) Update will add recent information to the City's 1999 TSP
- This is a long-term (20 year) plan to identify:
  - Safe Routes to new schools
  - Bicycle improvements
  - Pedestrian Improvements
  - Safety improvements

Who is involved?

- The City of Vernonia
- Oregon Department of Transportation
- Columbia County
- Oregon Department of Land Conservation and Development
- The Vernonia Community
- Planning consultants:
  - CH2M HILL
  - Alta Planning + Design

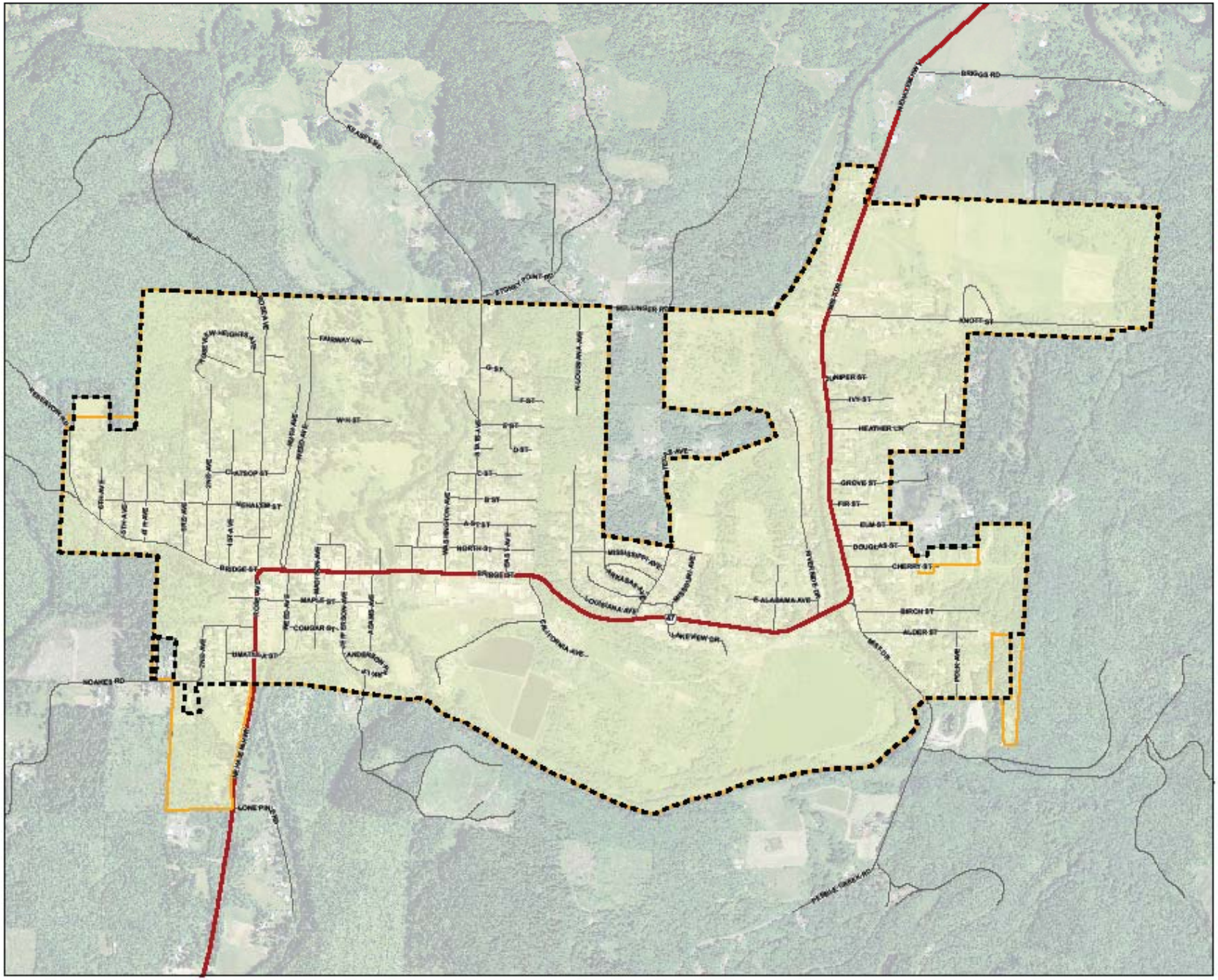
Schedule


Vernonia Transportation System Plan Update Schedule
Aug.
Sept.
Oct.
Nov.
Dec.
Jan.
Feb
March
April
May
June
July
2010
2011
Public Involvement
Existing Conditions and Future Needs
We are here
Transportation Alternatives and Analysis
Draft TSP Preparation
Plan Adoption
PAC and PMT Meeting
Community Workshop
Community Briefing
As of November 2010

Project Goals

- Operation and Safety
  - Preserve and improve function, capacity, and level of service and safety of the roadway system
- Transportation Alternatives
  - Support use of other modes, especially bicycles and pedestrians, including transit
  - Support Safe Routes to Schools programming and projects
  - Receive input on airport operations and expansion
- Finance
  - Sound fiscal approach to financing transportation system improvements

Project Study Area



LEGEND

- State Highway
- Streets
- City Limits
- Urban Growth Boundary
- Study Area

0 250 500 1,000
Feet

Study Area
Vernonia Transportation System Plan
City of Vernonia, Oregon

WRGBAIPROJ\ODOT\410377\VERNONIA\GIS\MAPFILES\FIGURE_1_STUDYAREA.MXD EDURBA 10/22/2010 10:19:17

Findings to Date

- All study area intersections operate within State and City standards
- There are limited and disconnected sidewalks throughout Vernonia
- O-A Hill is an obstacle to east-west pedestrians within Vernonia
- There are only a few bicycle lanes along OR 47
- Cyclists share travel lanes over the Rock Creek and Nehalem River Bridges

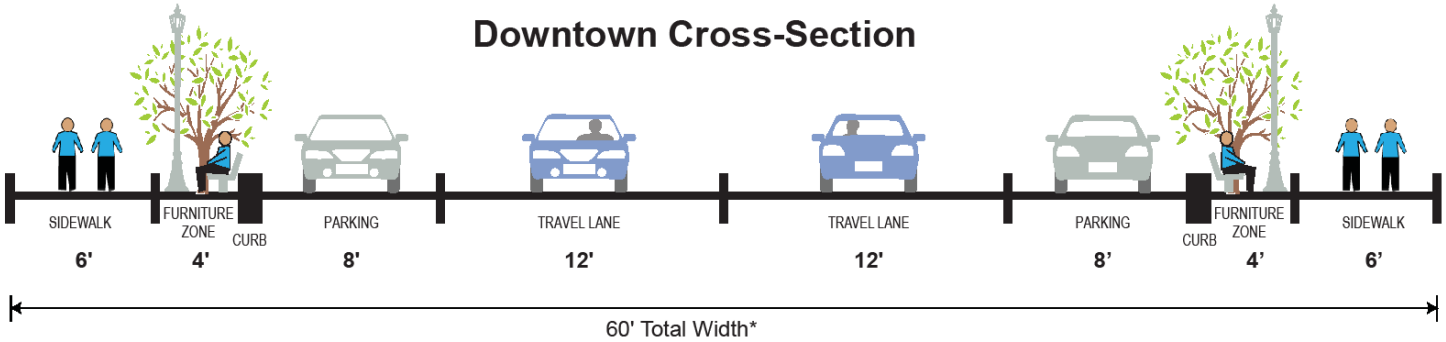
Safe Routes to New Schools

Potential Roadway Cross-Sections

- The City has a variety of available right-of-way widths
- The potential cross-sections provide a range of options based on available room

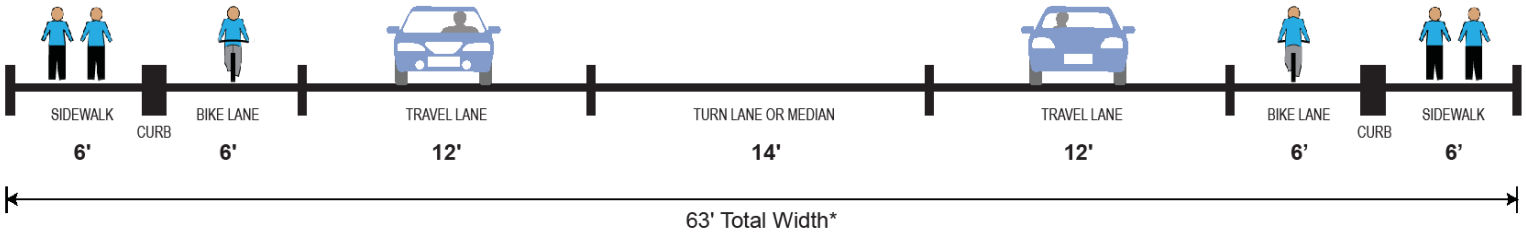
OR47 (Arterial Road) Range of Cross-Sections

Downtown Cross-Section



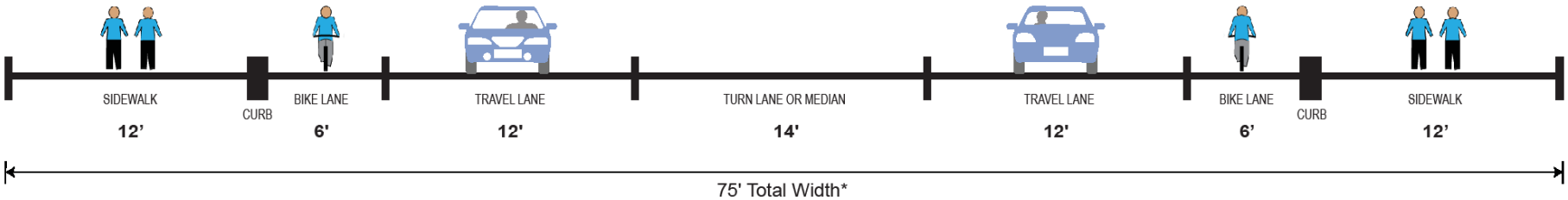
* 1' for curb

Minimum Cross-Section



* 1' for curb

Maximum Cross-Section



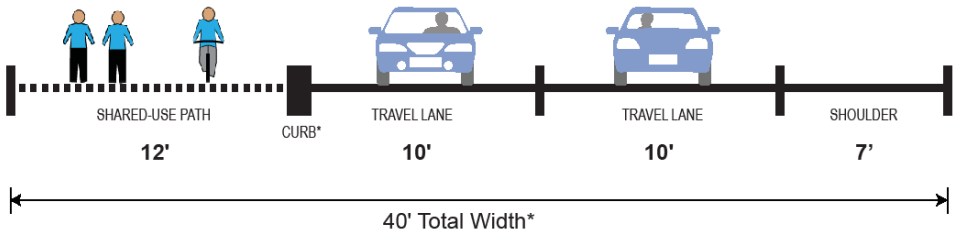
* 1' for curb

Range of Collector Road Cross-Sections

Collector Streets are:

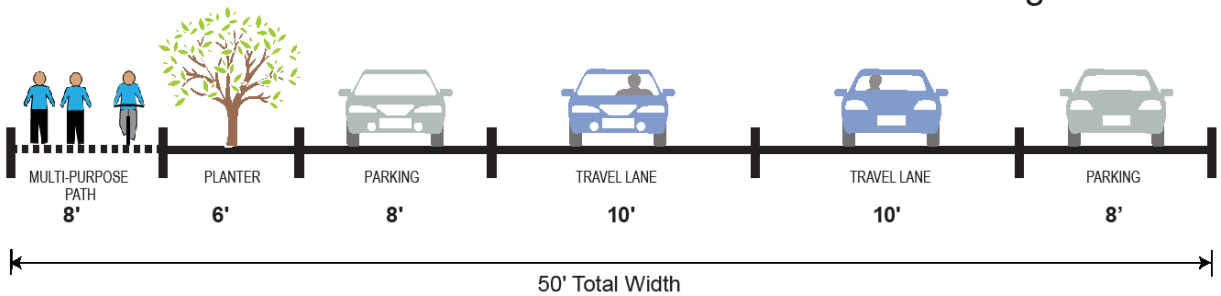
- Rose Ave (North of Bridge St), 75' ROW
- Nehalem St (West of Rose Ave), 50' ROW
- State Ave, 50' ROW
- Louisiana Ave, 50' ROW
- Knott St, 40' ROW
- Cougar St (West of Rose Ave), 60' ROW

Minimum Cross-Section: Shared-Use Path on One Side with Curb

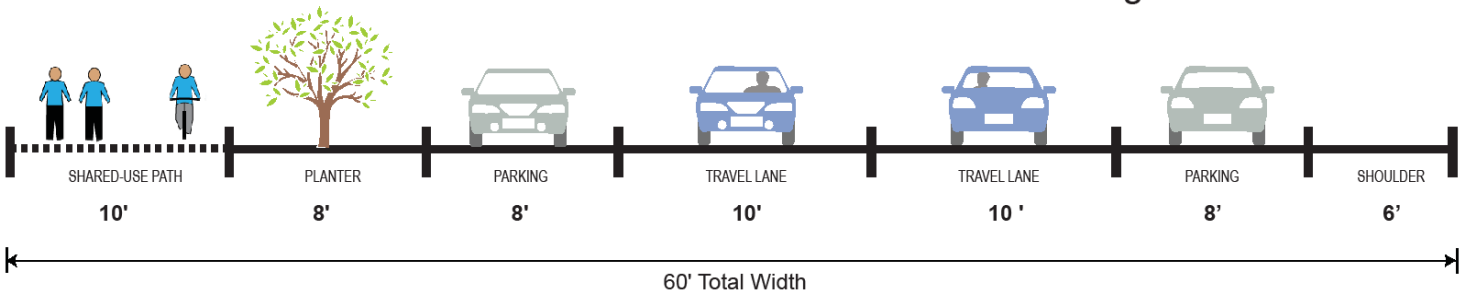


* 1' for curb

Intermediate Cross-Section: Shared-Use Path and Parking One Side

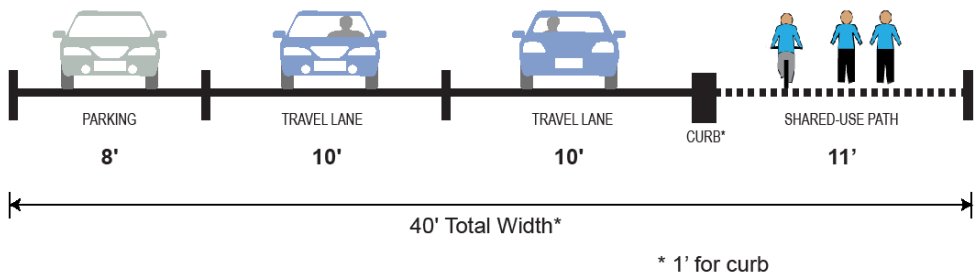


Maximum Cross-Section: Shared-Use Path and Parking One Side



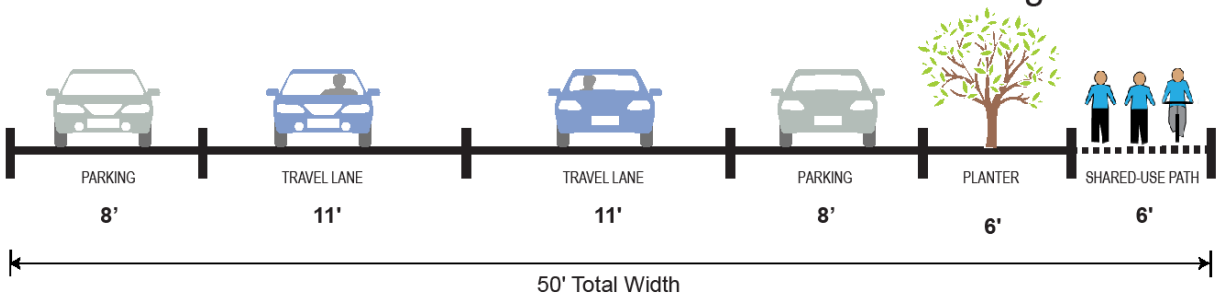
Range of Local Road Cross-Sections

Minimum Cross-Section: Shared Use Path with Curb, Parking One Side



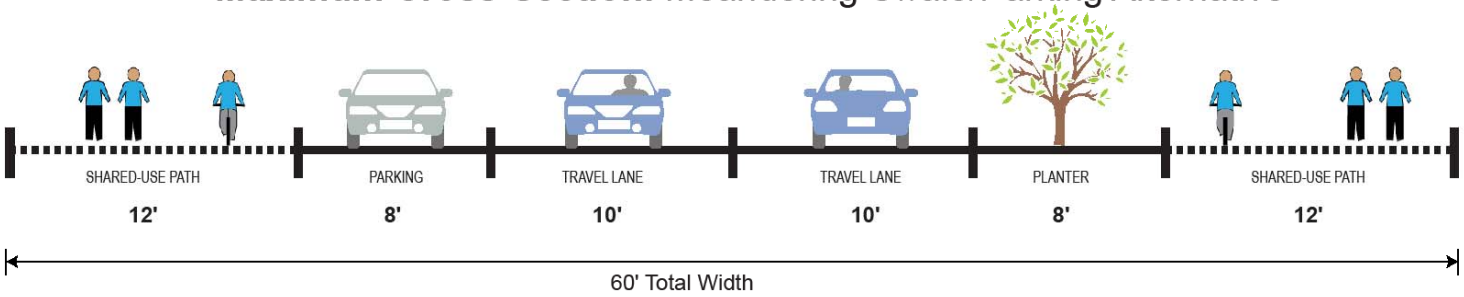
NOTE:
On local streets, bicycles are assumed to be able to share the travel lane or the shared-use path.

Intermediate Cross-Section: Shared-Use Path and Parking Both Sides

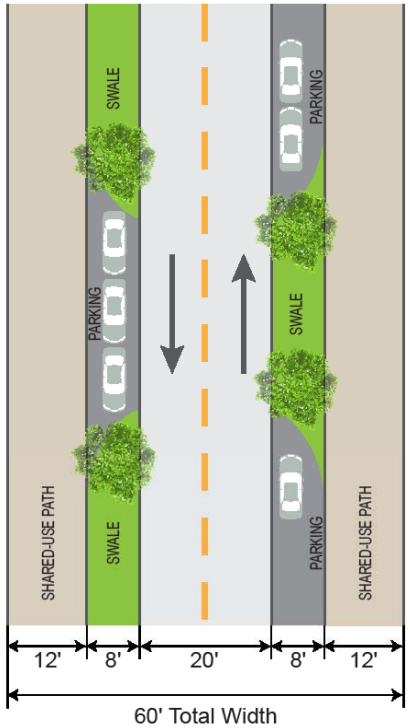


NOTE:
Could also be a meandering swale/parking (see 60' width option)

Maximum Cross-Section: Meandering Swale/Parking Alternative



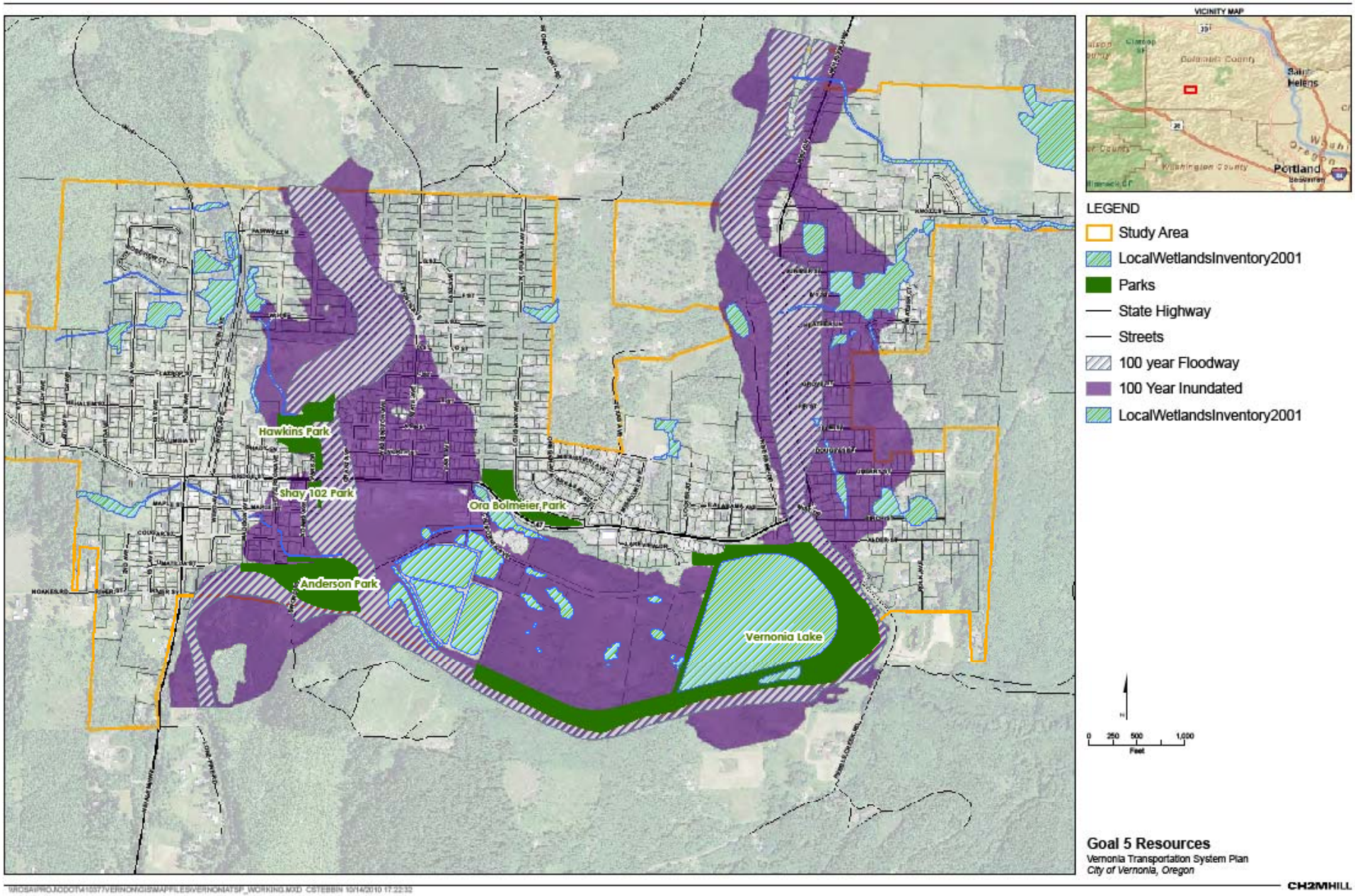
Maximum Cross-Section Aerial View



Potential Build Alternatives

- The project team brainstormed two groups of potential alternatives:
  - High-build, long-term alternatives
  - Low-Build, short-term alternatives

Environmental Constraints



High Build Alternatives

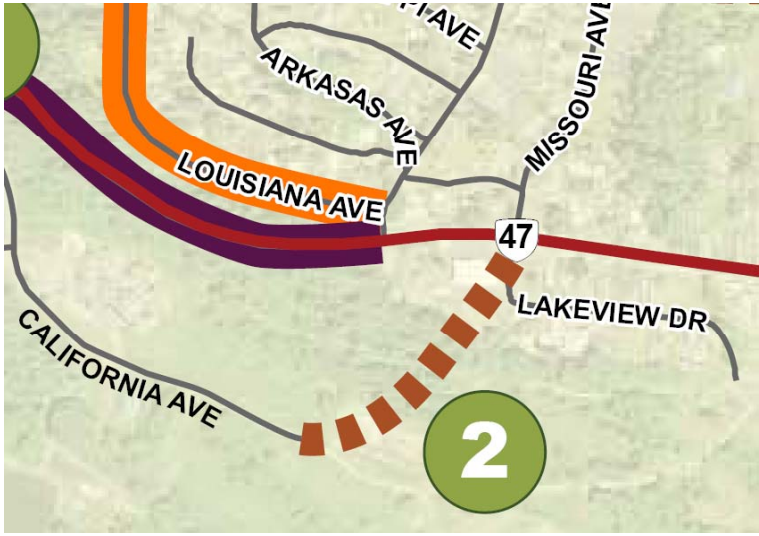
Discussion and planning-level cost estimates

1. Widen OR 47, add Bicycle/pedestrian path on both sides

- The existing path is narrow, and only on one side.
- Need to upgrade the highway retaining wall
- Cost estimate: $8,831,000

2. Pedestrian and bicycle connection between California and Missouri Avenues

- Off-highway bicycle and pedestrian route to the new schools site
- Difference in grade between California and Missouri
- Floodplain and wetlands
- Cost estimate: $450,000

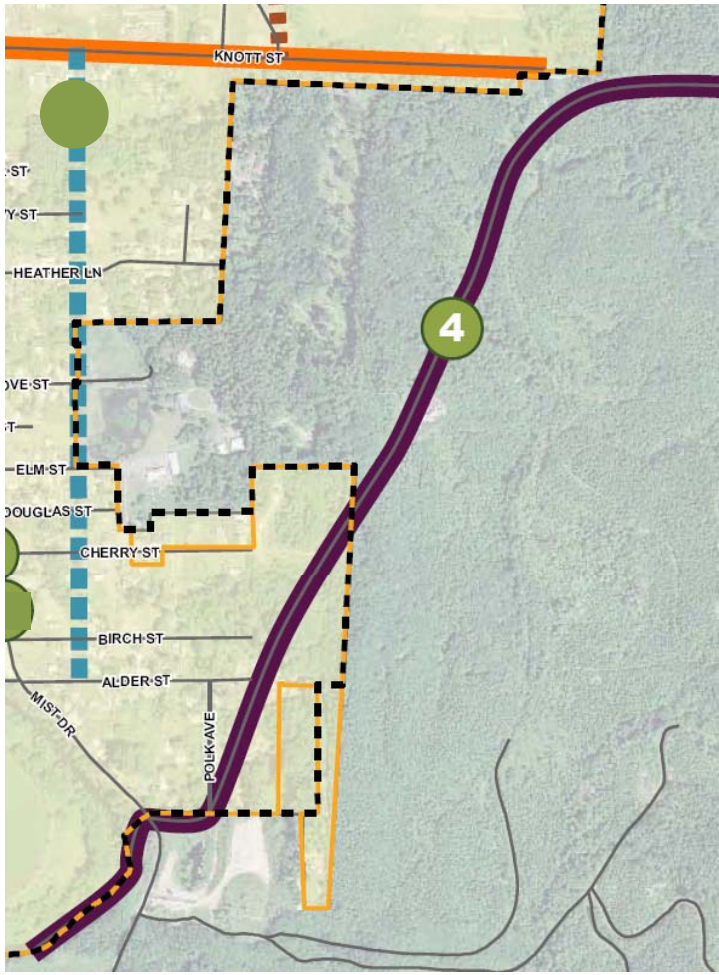


3. Add a dedicated bicycle/pedestrian bridge over the Nehalem River

- Would allow students who live near Mist Drive to cross the river to get to school
- Connect to bicycle and pedestrian path to link to school
- Exact location to be determined
- Cost Estimate: $1,689,000

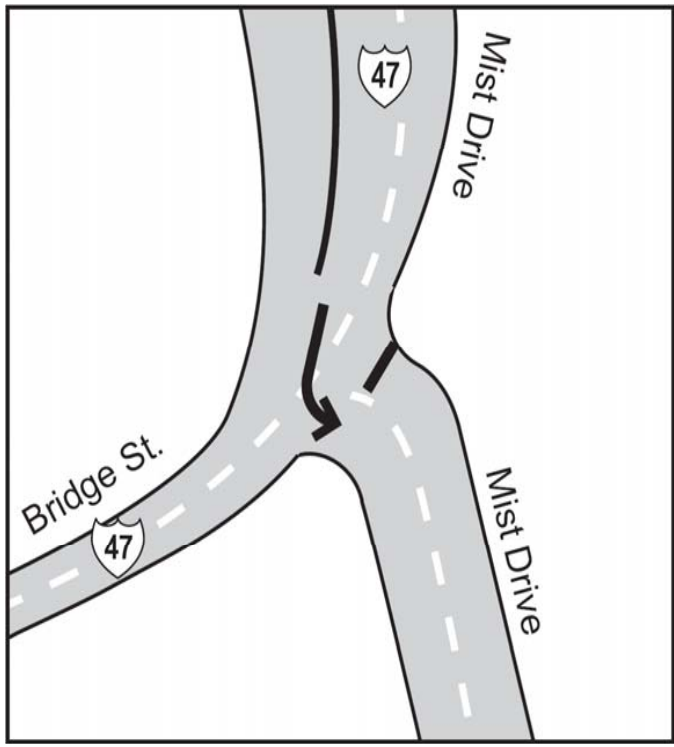
4. Connect the future Crown-Zellerbach Trail to the Banks-Vernonia Trail

- Would provide a continuous trail connection through Vernonia
- Would require a bridge over Nehalem River
- Property and easement issues through private land
- Floodplain and wetlands
- Cost estimate: $1,710,000



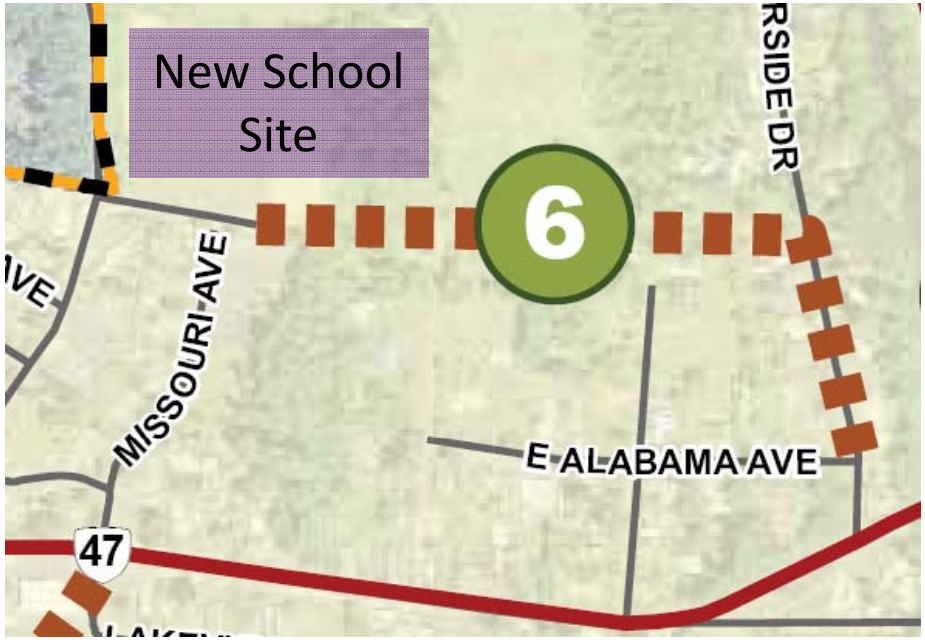
5. Reconfigure the Mist Drive/Bridge Street Intersection

- Would "T" up the south leg of Mist Drive
- Would require some widening of the highway north of the intersection
- Floodway and floodplain issues
- Cost estimate: $369,000



6. Create Bicycle and Pedestrian connection to school from Riverside Drive

- Would connect the new schools to Riverside Drive – allowing students to avoid OR 47
- Potential wetlands impacts
- Cost estimate: $220,000



7. Potential Connectivity Improvements

- There is currently limited connectivity in Vernonia
- Provide options for emergency vehicles, reduce reliance on the highway
- Most have wetlands and floodplain issues.

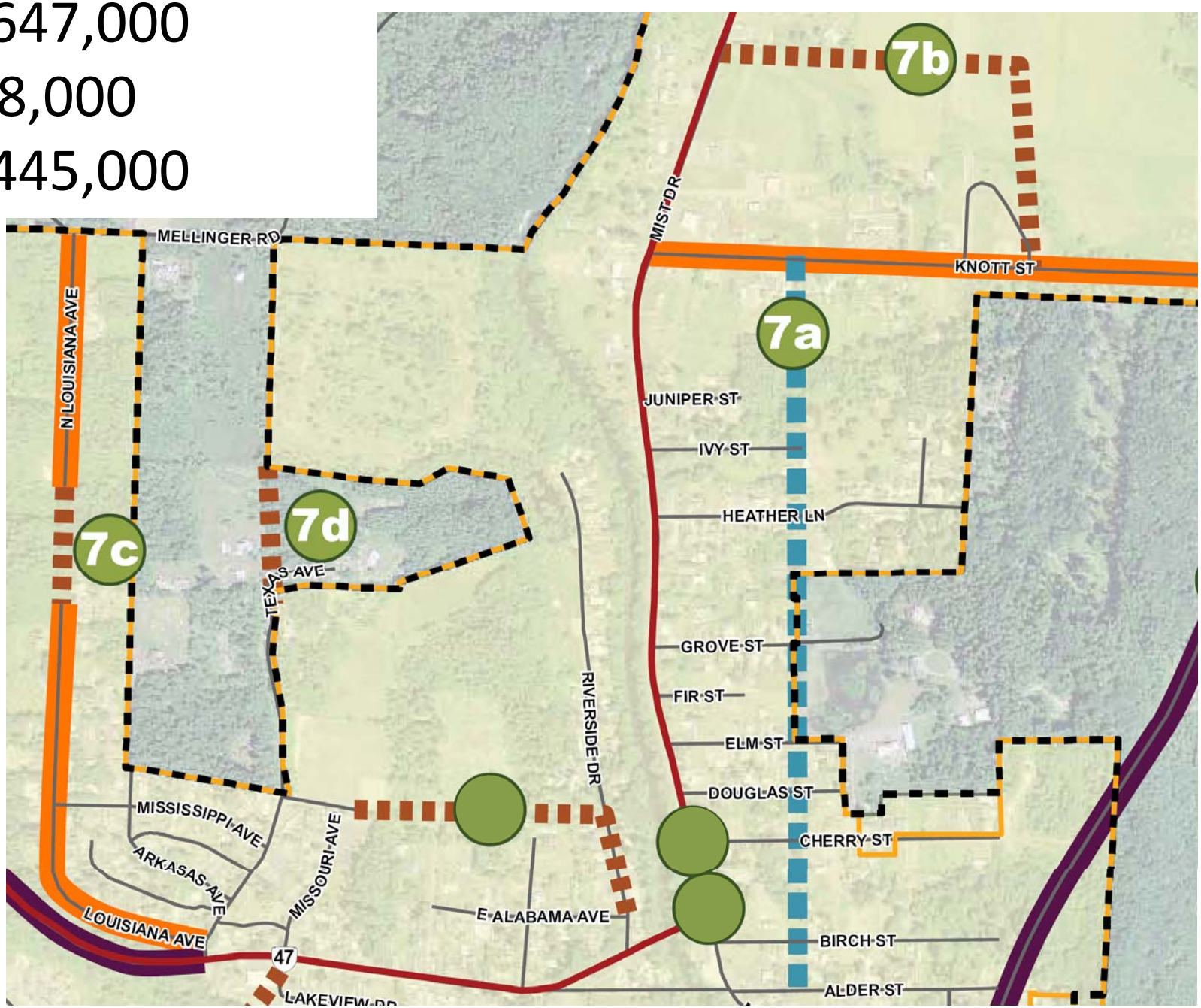
Cost Estimates:

7a - $452,000

7b - $2,647,000

7c - $358,000

7d - $1,445,000



8. Potential Transit Improvements – Park and Ride Facility

- Could use existing facilities, potentially the new park space where the current schools are located
- Would formalize the bus stops in town
- Based on demand and available funds
- No cost estimate provided, as it is expected that existing facilities will be used

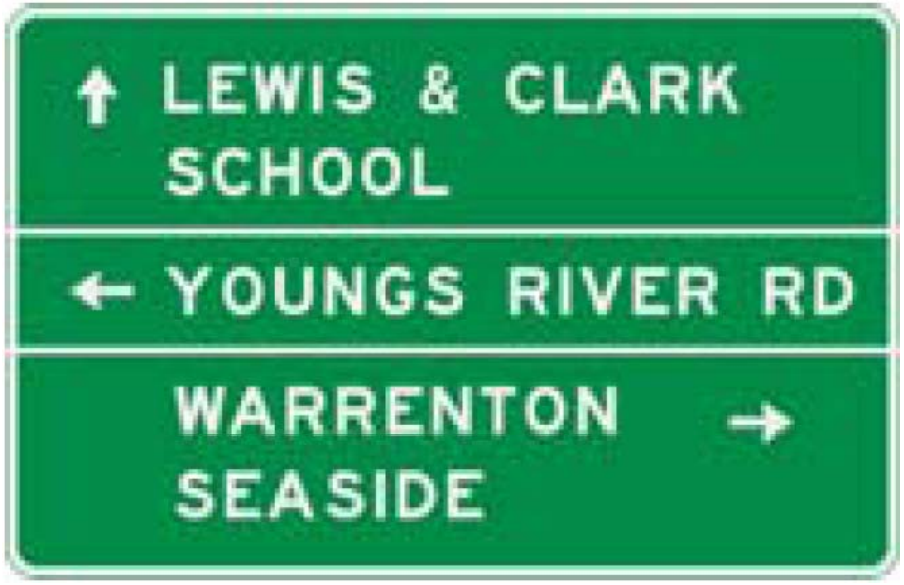
Low Build Alternatives

Discussion and planning-level cost estimates

A. Improve Signage at OR 47 and Rose Avenue

- Reduce confusion for visitors
- Lower cost option to adding any facilities
- Cost estimate: $10,000

Signage example



B. Improve Pedestrian Crossing at Bridge Street west of O-A Hill

- Would allow bicyclists and pedestrians an identified place to cross to access the sidepath on OR 47
- Would connect existing sidewalks
- Cost estimate: $50,000

C. Construct sidewalk along OR 47/Mist Drive

- This project would construct a sidewalk on the east side of the highway
- Would provide a pedestrian connection to the Green Bridge for those east of the highway.
- Less of a priority if the linear trail through the tree streets is constructed
- Floodway and floodplain issues
- Cost estimate: $750,000

D. Add and Connect Sidewalks, and Add Bicycle Facilities on Connectors

- Collector Streets are:
  - Knott Street
  - Louisiana Avenue
  - State Avenue
  - Rose Avenue north of Bridge Street
  - Nehalem Street west of Rose Avenue
  - Cougar Street and 2nd Avenue west of Rose Avenue
- Cost estimate total: $5,480,000

E. Add Bicycle and Pedestrian Connection between Schools and Nehalem View Development

- Would connect the new schools with anticipated residential development
- Off-street path would allow students to avoid the highway
- Cost estimate: $210,000

F. Consider Striping, Curb Bulb-outs, and/or Bioswales for No Parking at Corners

- Parked cars currently create sight distance issues
- Would limit parking at street corners along the highway.
- Cost Estimate: $13,000-$15,000 per corner, 11 corners assumed

G. Safe Routes to School Improvements

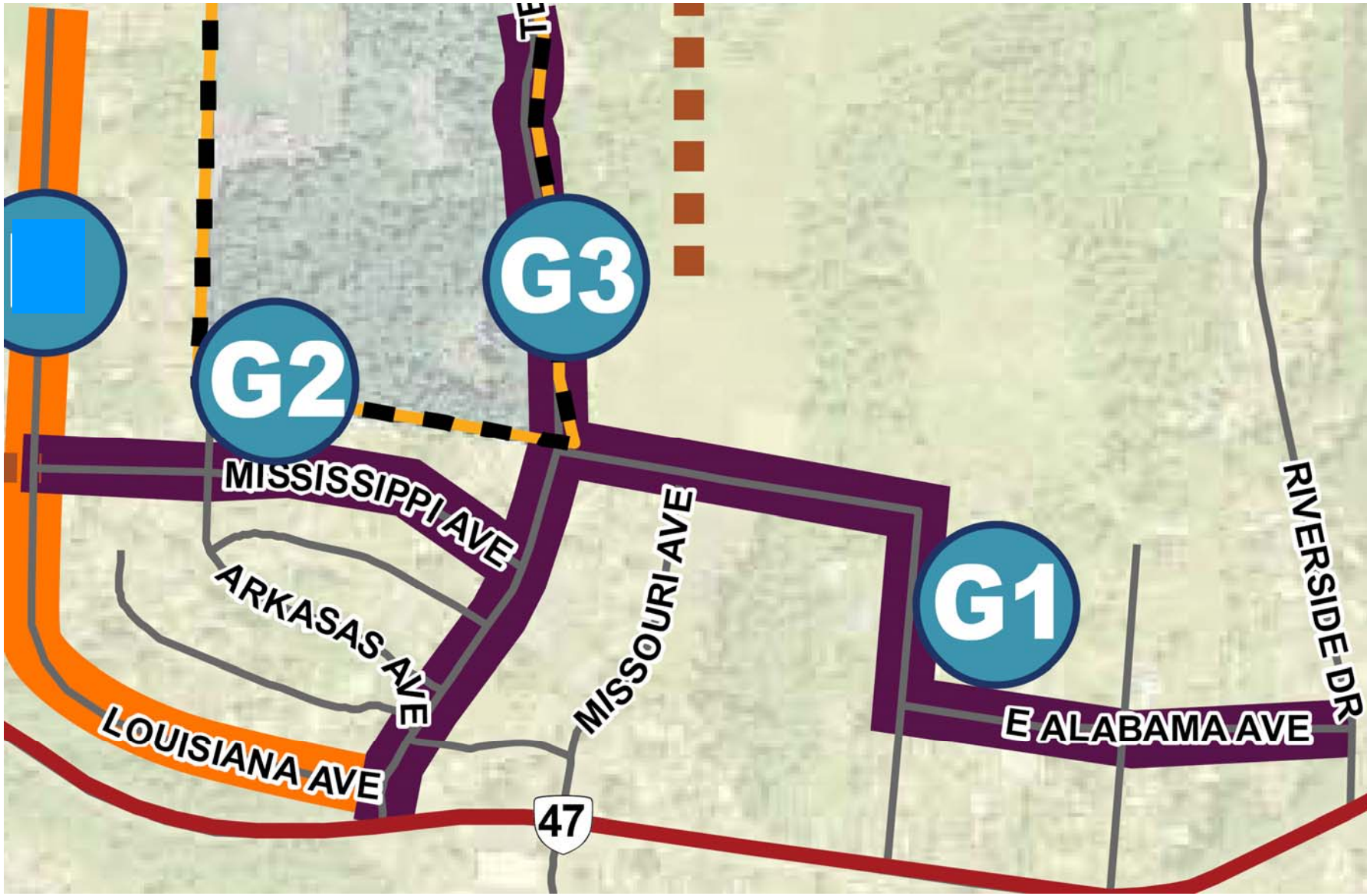
- Would upgrade bicycle and pedestrian facilities on Alabama, Mississippi, and Texas Avenues
- Would add 6 foot sidewalks on one side

Cost Estimates:

G1 Alabama Avenue - $150,000

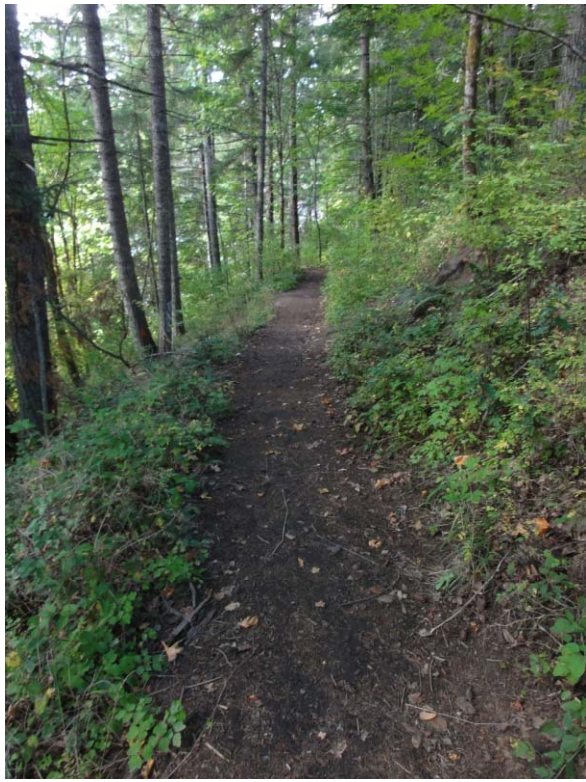
G2 Mississippi Avenue - $110,000

G3 Texas Avenue - $80,000



H. Soft-surface Trail up O-A Hill

- Would formalize the paths on the west side of O-A Hill
- Would mitigate erosion issues, and consolidate existing paths into a single-track
- Cost Estimate: $55,000



I. Extend Collector Street Designation on Cougar east of OR 47

- This would require Cougar Street to meet the future Collector Street standards
- Would make Cougar a collector from 2nd Avenue to Jefferson Street.
- Cost Estimate: Free!

Next Steps

- Draft the Transportation System Plan Update document (February-April)
- Community Briefing #2 – Present an overview of the Draft TSP Update (April)
- Planning Commission and City Council will review the draft plan and vote on adoption (June/July)

Questions?

Vernonia Transportation System Plan Update

Planning Commission and City Council Worksession #2

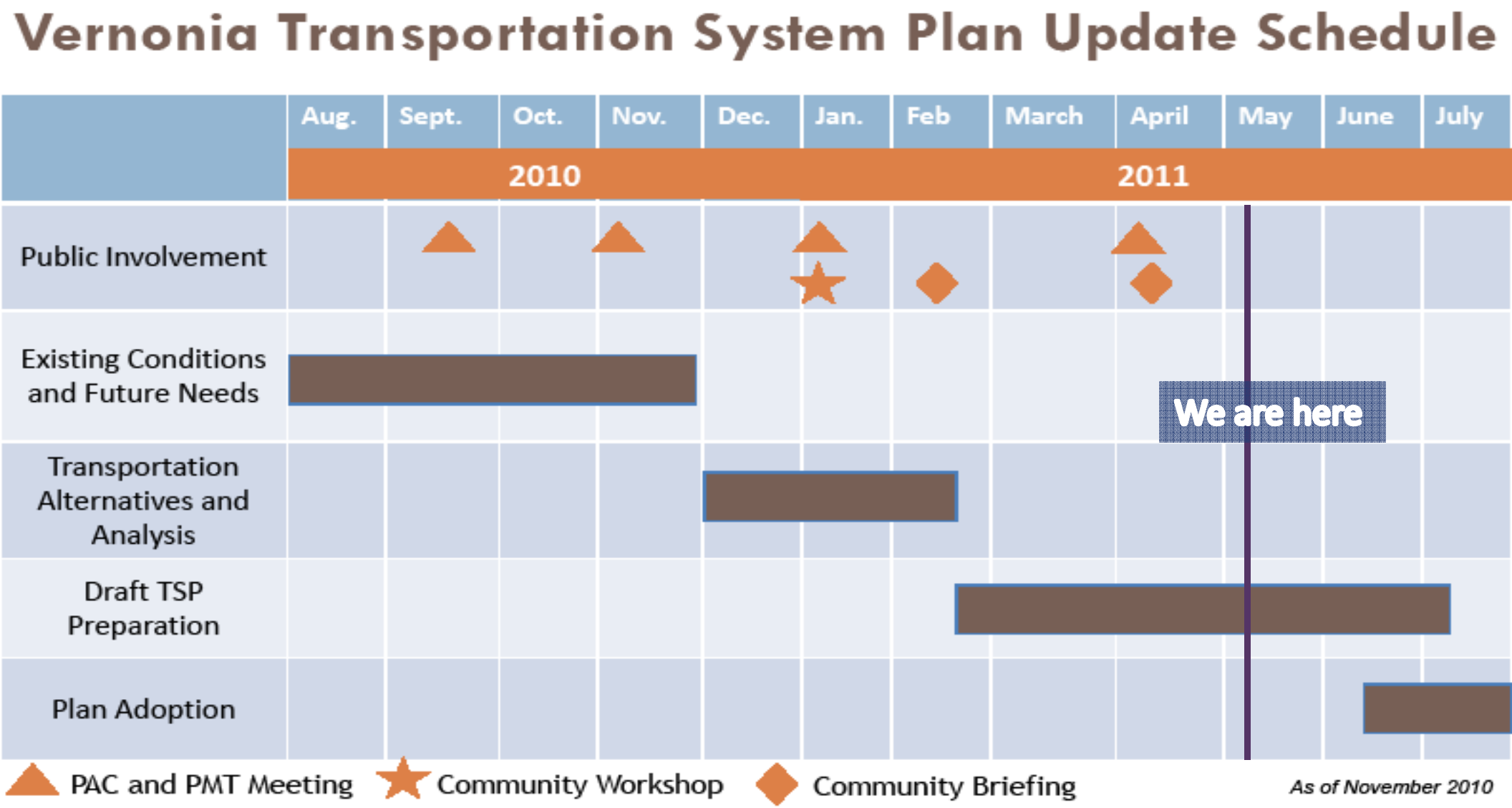
Tonight we will:

- Present recommended and prioritized projects to improve the City's transportation system
- Identify funding sources and present draft amendments to the City's land use regulations
- Review draft implementation ordinance for adoption

Project Background

- This Transportation System Plan (TSP) Update will add recent information to the City's 1999 TSP
- This is a long-term (20 year) plan to identify:
  - Safe routes to new schools
  - Bike-pedestrian improvements
  - Safety improvements
  - Street connectivity

Project Schedule

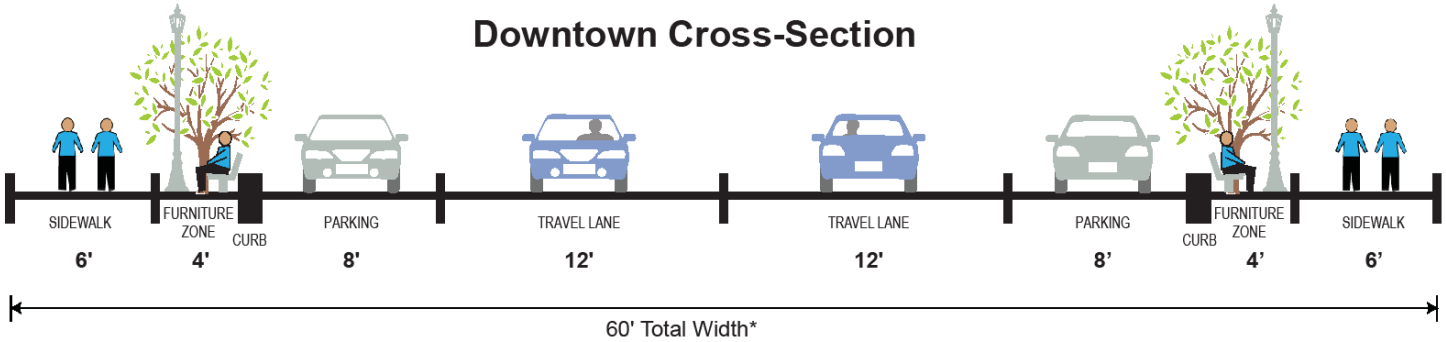


Recommended Roadway Cross-Sections

- The City has a variety of available right-of-way widths
- The recommended cross-sections provide a range of options based on available room

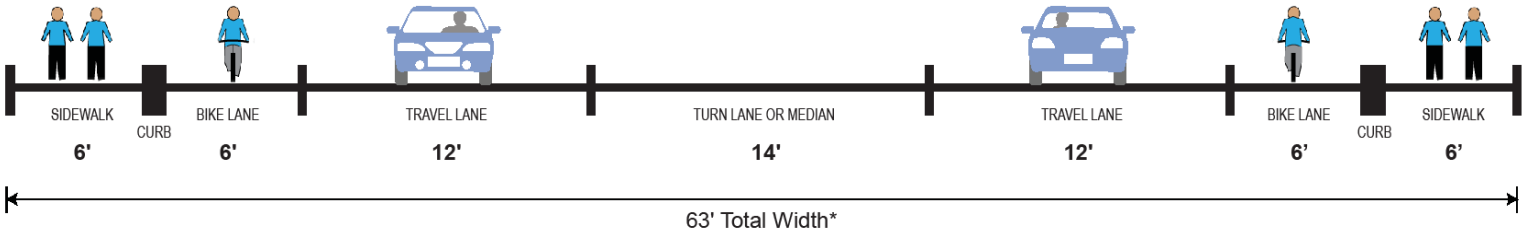
OR47 (Arterial Road) Range of Cross-Sections

Downtown Cross-Section



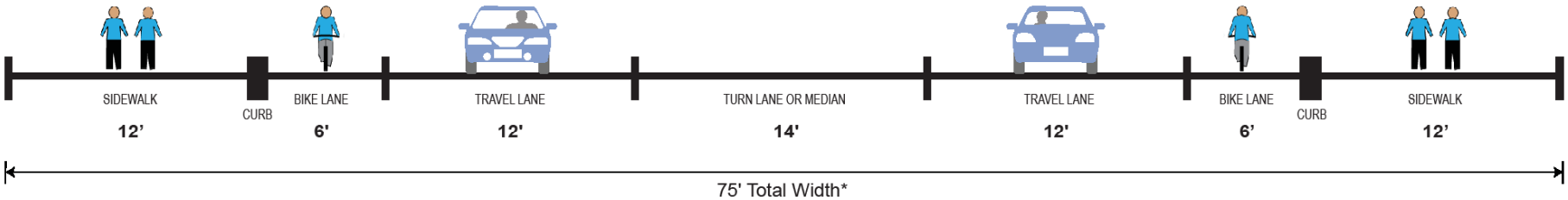
* 1' for curb

Minimum Cross-Section



* 1' for curb

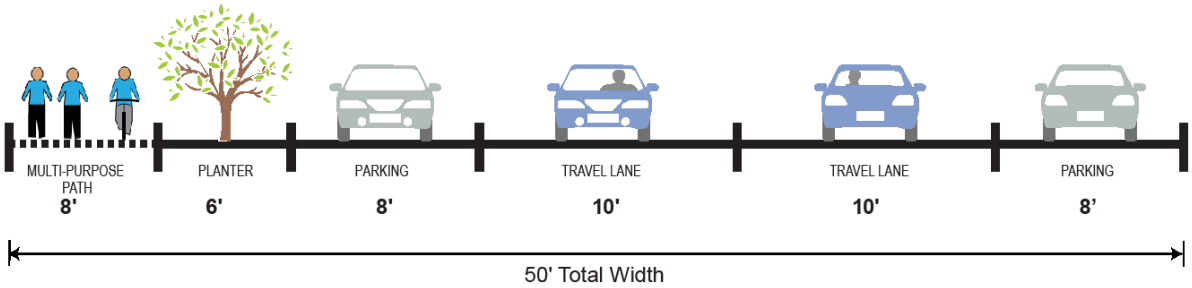
Maximum Cross-Section



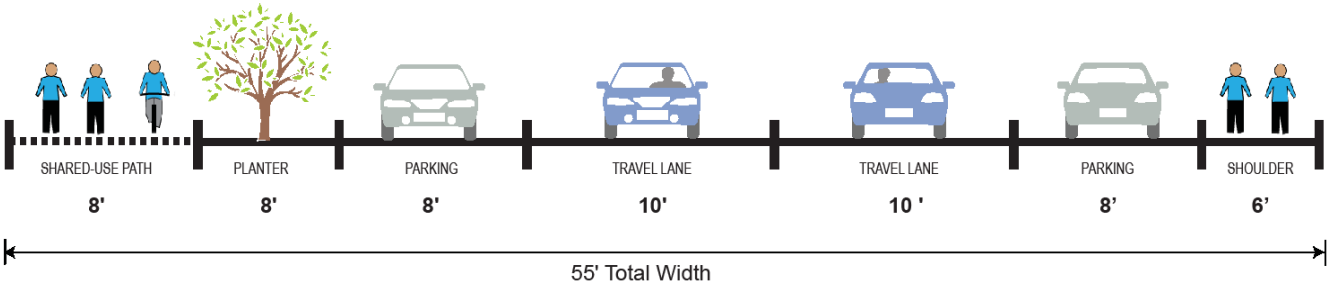
* 1' for curb

Range of Collector Road Cross-Sections

Minimum Cross-Section: Shared-Use Path on One Side



Maximum Cross-Section: Pedestrian Facilities and Parking on Both Sides

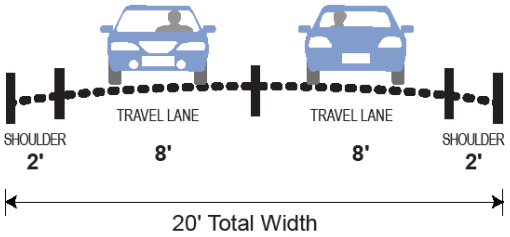


Collector Streets are:

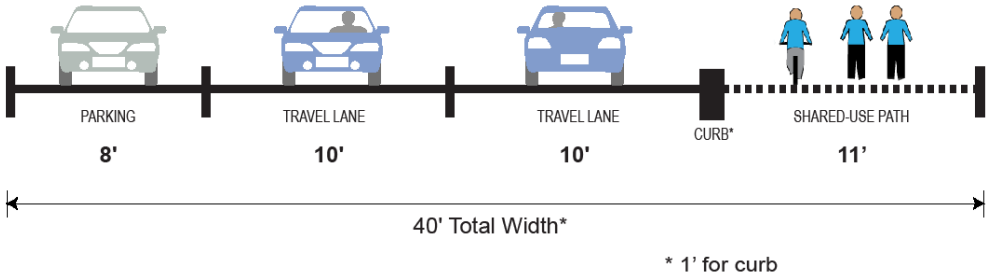
- Rose Ave (North of Bridge St), 75' ROW
- Nehalem St (West of Rose Ave), 50' ROW
- State Ave, 50' ROW
- Louisiana Ave (South Segment), 50' ROW
- Louisiana Ave (North Segment), 60' ROW
- Knott St, 60' ROW
- Cougar St (West of Rose Ave), 60' ROW

Range of Local Road Cross-Sections

Minimum Cross-Section: Gravel

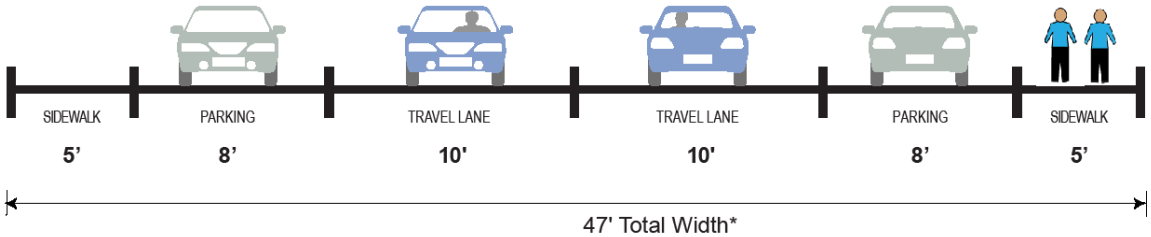


Intermediate Cross-Section: Shared Use Path with Curb, Parking One Side



NOTE:
On local streets, bicycles are assumed to be able to share the travel lane or the shared-use path.

Maximum Cross-Section: Sidewalk and Parking Both Sides



* Also an option for a wide path and planter on one side

Project Recommendations

- To fit the structure of the Existing TSP, the improvements recommendations were split into two categories:
  - Roadway Recommendations
  - Bicycle and Pedestrian Recommendations

LEGEND

- State Highway
- Streets
- City Limits
- Urban Growth Boundary
- Study Area
- Collector Streets
- Recommended Street Connections
- RD-1 Improve signage at OR47 and Rose Avenue
- RD-2 Widen OR47; add bicycle/pedestrian path on both sides
- RD-3 Reconfigure the Mist Drive/Bridge Street intersection
- RD-4 Restrict parking at corners on OR47
- RD-5 East-West road connection north of Knott Street
- RD-6 Connect Louisiana Avenue
- RD-7 Extend Texas Avenue to Mellinger Road

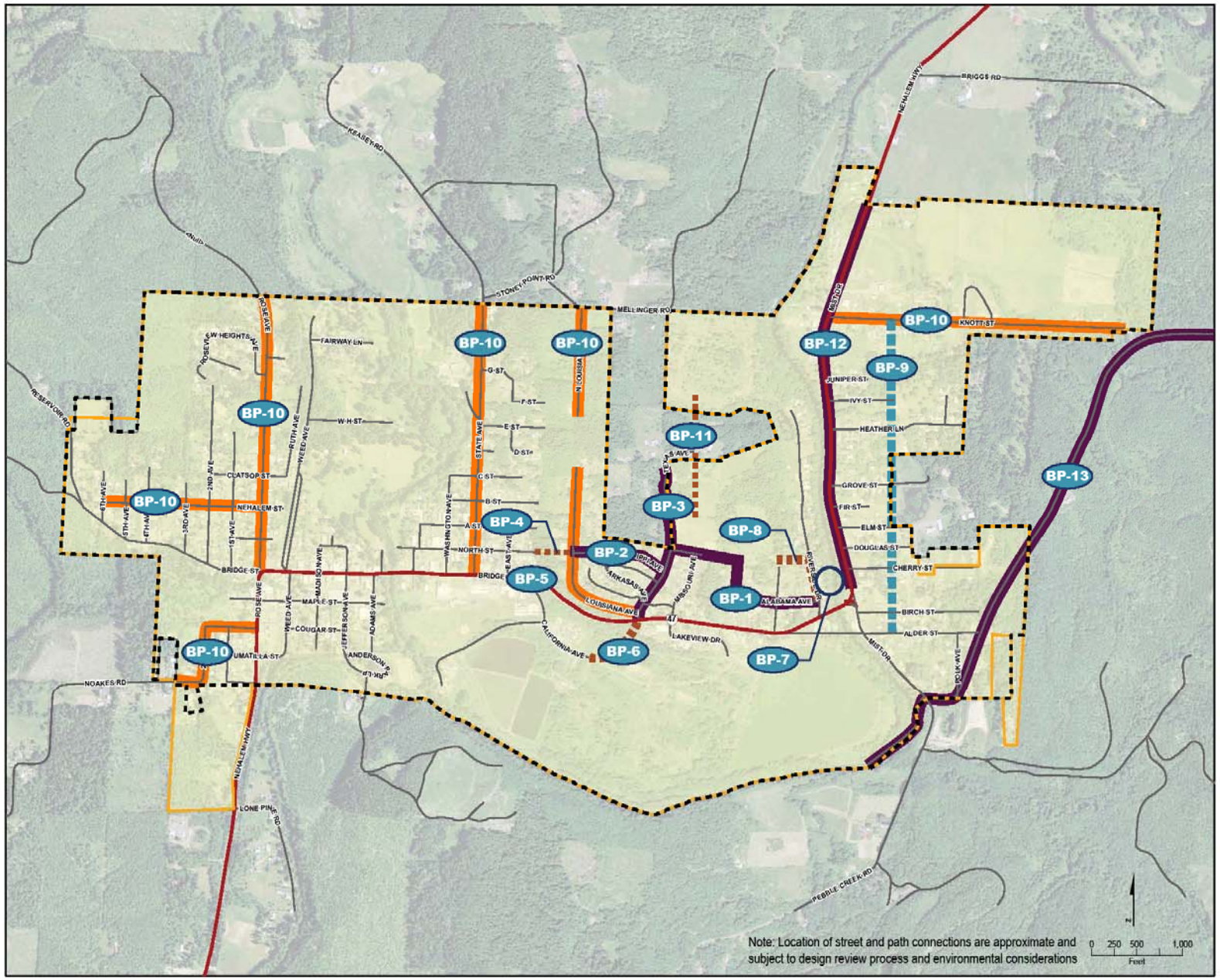
Note: Location of street and path connections are approximate and subject to design review process and environmental considerations

Roadway Projects
Vernonia Transportation System Plan
City of Vernonia, Oregon

TBG0419112035 32PDX_041911_01

Action Plan – Roadway Projects

	Improvement	Cost Estimate (2011 $)	Timeframe
RD - 1	Improve signage at OR 47 and Rose Avenue	$10,000	Short
RD – 2	Widen OR 47, add bicycle and pedestrian path on both sides	$8,463,000	Medium
RD – 3	Reconfigure the Mist Drive/Bridge Street intersection	$369,000	Medium
RD – 4	Bridge Street signing and Striping, potential bioswales, concrete bumps or curb bulb-out extensions. There are a total of 7 corners in the downtown core that would be eligible for this treatment.	$13,000-$15,000 each corner	Short
RD – 5	Add an east-west local street north of Knott Street to provide additional access to the light industrial parcel east of Mist Drive/OR 47	$2,647,000	Long
RD – 6	Connect the north and south sections of Louisiana Avenue	$358,000	Medium
RD – 7	Connect Texas Avenue to Mellinger Road at the north of the City's UGB	$1,445,000	Long



LEGEND

- State Highway
- Streets
- City Limits
- Urban Growth Boundary
- Study Area
- Collector Streets
- Recommended Bicycle and Pedestrian Path Connections
- Linear Park/Trail Through City-Owned Properties
- BP-1 Safe routes to school connection – Alabama Ave.
- BP-2 Safe routes to school connection – Mississippi Ave.
- BP-3 Safe routes to school connection – Texas Ave.
- BP-4 Soft-surface trail improvements up O-A Hill. Exact location to be determined.
- BP-5 Improve pedestrian crossing at OR47 to access the side path on O-A Hill. Exact location to be determined.
- BP-6 Pedestrian and bicycle connection between California and Missouri Avenues.
- BP-7 Dedicated bicycle/pedestrian bridge over the Nehalem River.
- BP-8 Bicycle/pedestrian connection – new schools to Riverside Drive.
- BP-9 Linear north-south trail connecting the "Tree Streets".
- BP-10 Add sidewalks or connect existing sidewalks along collector streets. Add bicycle facilities or shared lane markings.
- BP-11 Add bicycle and pedestrian connection between new schools and future Nehalem View development. Exact location to be determined.
- BP-12 Add sidewalk along OR47/Mist Drive (east side).
- BP-13 Connect future Crown-Zellerbach Trail to Banks-Vernonia Trail.

Bicycle and Pedestrian Projects

Vernonia Transportation System Plan

City of Vernonia, Oregon

TBG041911203532PDX_041911_01

Action Plan – Bicycle and Pedestrian Projects

	Project	Cost Estimate	Time Frame
BP -1	Safe Routes to School Connection – Alabama Avenue	$150,000	Short
BP -2	Safe Routes to School Connection – Mississippi Avenue	$110,000	Short
BP -3	Safe Routes to School Connection – Texas Avenue	$80,000	Short
BP -4	Soft-Surface Trail Improvements up O-A Hill	$60,000	Short
BP -5	Improve Pedestrian Crossing on OR 47/Bridge Street to Access O-A Hill Sidepath	$50,000	Short
BP -6	Pedestrian and Bicycle Connection between California Avenue and Missouri Avenue	$450,000	Medium
BP -7	Create a bicycle/pedestrian bridge over the Nehalem River in the vicinity of Alabama Avenue.	$1,689,000	Medium
BP -8	Create a Bicycle/Pedestrian Connection to the New Schools from Riverside Drive	$230,000	Medium
BP -9	Add a pedestrian/bicycle trail north-south east of Mist Drive/OR 47 to connect the “tree streets”	$452,000	Short/Medium
BP -10	Construct Sidewalks and Bicycle Facilities on Collector Streets	$5,480,000	Medium/Long
BP -11	Bicycle/Pedestrian Connection From Vernonia Schools to Nehalem View Development	$210,000	Medium/Long
BP -12	Construct Sidewalk Along OR 47/Mist Drive	$750,000	Long
BP -13	Connect Future Crown-Zellerbach Trail to Banks-Vernonia Trail	$1,710,000	Long

Existing Funding and Revenue Sources

- Federal & State Hwy Funds distributed by ODOT & ACTs chosen by the OTC and included in the STIP
- ODOT Small City Allotments
- FEMA
- Vernonia Street Improvement Bond ($470K 2001-2011)
- Vernonia System Development Charges (SDC)

Potential Local Revenue Sources

- Increase Transportation SDCs and Developer Fees
- Institute Park SCDs
- Create Local Improvement Districts (LIDs)
- Install parking meters, collect fines
- Issue Revenue and General Obligation Bonds
- Institute Street Utility Fees
- Local Option Levies

State of Oregon Transportation Funding Programs

- ODOT STIP (State and Federal funds)
  - Transportation Enhancement
  - Bicycle and Pedestrian Program
  - Operations (Signs and illumination)
  - Highway Safety Improvement Program
  - Modernization Program
- Other State of Oregon sources
  - Community Development Block Grant
  - State Parks Recreational Trails Grant
  - Urban Trails Fund
  - Land and Water Conservation Fund

TSP Implementation

- The TPR (OAR 660 Division 12) implements Oregon's Statewide Planning Goal 12 (Transportation) and promotes the development of safe, convenient, and economic transportation systems that reduce reliance on automobile travel.
- TPR Section 660-012-0045(1) requires that "*each local government shall amend its land use regulations to implement the TSP.*"

Code and Comp Plan Amendments

- Recommended changes are based on a Reviewed City Zoning Ordinances and the Comprehensive Plan for consistency with the TPR.
- TM #7 indicates recommended changes by <u>underlining</u> of new/revised text and ~~strikethrough~~ of deleted text.

Next Steps

- Project team will revise the draft TSP Update based upon comments from tonight's work session.
- Project team will deliver electronic files of the final TSP Update.
- Planning Commission and City Council will hold hearings, and vote on adoption.
- City Council may consider funding and revenue options.

APPENDIX B

GOALS, PLANS, AND POLICIES

Goals, Policies, and Plans: City of Vernonia Transportation System Plan Update

PREPARED FOR: Carole Connell, City of Vernonia
Bill Haack, City of Vernonia
Seth Brumley, ODOT

PREPARED BY: Terra Lingley, CH2M HILL

COPIES: Larry Weymouth, CH2M HILL

DATE: September 29, 2010

This memorandum provides background information to help inform the City of Vernonia's Transportation System Plan Update by determining the applicable goals, policies, and plans of Vernonia, the County, and the State.

The following relevant plans and policies have been reviewed to determine data gaps for the Transportation System Plan (TSP) Update, and to ensure that the update complies with all applicable plans and policies:

State

- Oregon Transportation Plan (2006)
- Oregon Highway Plan and Amendments (1999)
- Transportation Planning Rule (OAR Chapter 660, Division 012)
- Oregon Access Management Rule (OAR Chapter 734, Division 51)
- ODOT Highway Design Manual and amendments
- Oregon Bicycle and Pedestrian Plan (2009)
- Statewide Transportation Improvement Program (1999-present)

County

- Columbia County Community-Wide Transit Plan and US 30 Transit Access Plan (2009)
- Columbia County Rural Transportation System Plan (1998)

City

- City of Vernonia Transportation System Plan (1999)
- City of Vernonia Comprehensive Plan
- City of Vernonia Zoning Code and Public Works Standards

- Vernonia School Siting Study: Comparative Assessment of Transportation Needs (2009)
- Vernonia School Campus Transportation Impact Analysis (2010)
- Western Oregon Electric Cooperative Headquarters Facility, Transportation Impact Analysis (2010)
- Nehalem View Subdivision Traffic Impact Study (2008)
- Wetland Inventory (2000)
- The 1999 Master Capital Plan for Vernonia , KCM 1999
- The Vernonia Vision and Strategic Plan, Rural Initiatives, 1997, and the associated 2010 update, Paul Koch
- City of Vernonia Downtown Revitalization Plan, KCM 1998
- The 2010 Flood Insurance Rate Map
- Draft Economic Opportunities Analysis (EOA) and Draft Buildable Lands Inventory, Seth Lenaerts, 2009

Plan and Policy Review

Oregon Transportation Plan (2006)

The Oregon Transportation Plan (OTP) is a policy document developed by ODOT in response to federal and state mandates for systematic planning for the future of Oregon's transportation system. The OTP is intended to meet statutory requirements (ORS 184.618(1)) to develop a state transportation policy and comprehensive long-range plan for a multi-modal transportation system that addresses economic efficiency, orderly economic development, safety, and environmental quality. The OTP is a long-range policy document that defines goals, policies and actions for the state for the next 40 years. The OTP's goals, policies, and actions integrate all modes of transportation with the intention of encouraging the most appropriate mode for each type of travel. The Plan's System Element identifies a coordinated multimodal transportation system to be developed over a 25-year horizon which is intended to implement the goals and policies of the Plan. The goals and policies of the OTP cover a broad range of issues.

The 2006 OTP addresses issues of population growth, economic development, sustainability, global warming, and transportation system funding among other challenges. It is the state's 25-year multimodal state transportation plan for airports, bicycles and pedestrian facilities, highways and roadways, pipelines, ports, public transportation, rail and waterways.

This version of the OTP implementation element is focused on mitigating congestion, strengthening transportation's role in economic development, serving the needs of an aging population, reducing traffic fatalities and serious injuries, increasing technology's role in improving safety and efficiency, protecting and sustaining resources, prioritizing investments, and making the most strategic use of limited funding. There are no specific recommendations to incorporate into the Vernonia TSP. Oregon Highway Plan (1999)

The 1999 OHP, an element and modal plan of the state's comprehensive transportation plan (OTP), guides the planning, operations, and financing of ODOT's Highway Division. The basic framework for the OHP is a refinement and application of the goals and policies stated in the OTP 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. Policies in the OHP emphasize the efficient management of the highway system to increase safety and to extend highway capacity, partnerships with other agencies and local governments, and the use of new techniques to improve road safety and capacity. These policies also link land use and transportation, set standards for highway performance and access management, and emphasize the relationship between state highways and local road, bicycle, pedestrian, transit, rail, and air systems.

Specific OHP policies with direct bearing on transportation system planning in Vernonia include the following:

Goal 1: System Definition

Policy 1A: State Highway Classification System

Policy 1A develops a state highway classification system to guide ODOT priorities for system investment and management. The state highway classification system includes five classifications: Interstate, Statewide, Regional, District, and Local Interest Roads. It also includes special provisions for roadways classified as an Expressway.

The Vernonia TSP update will analyze one district highway – OR 47. OR 47 inside Vernonia is classified in the OHP as a district Highway. Inside the city limits of Vernonia, OR 47 is functionally classified as an urban collector. District Highways are countywide facilities and function as county arterials or collectors. The management objective for District Highways is to provide for safe and efficient, moderate to high-speed continuous-flow operation in rural areas. The Vernonia TSP classifies Hwy 47 as either an urban arterial or rural arterial depending on the location. The update will need to evaluate the two classifications and balance the state's management objectives for OR 47 with the local needs and objectives of Vernonia in relation to OR 47.

Policy 1B: Land Use and Transportation

This policy recognizes the role of both state and local governments regarding the state highway system and calls for a coordinated approach to land use and transportation planning. It calls for coordination between ODOT and local governments to develop plans that support compact development within commercial and community centers, and

provides a definition for four highway segment designations which help guide the state's position on local land use planning and development standards. These designations are Special Transportation Areas (STAs), Commercial Centers, Urban Business Areas (UBAs), and Urban segments.

The only state-administered highway within the City of Vernonia is OR 47. The section of OR 47 from mile point 60.33 to mile point 62.77 is designated as an arterial. There is one section within the City of Vernonia that is designated a STA, from mile point 62.25 to 62.54. To provide coordination in the development of the Vernonia TSP update, a Project Management Team has been established that includes the City of Vernonia, DLCD, and ODOT.

In accordance with this policy, an analysis of planned future land uses will be performed for the TSP update to identify the potential for minimizing or mitigating future capacity deficiencies through land use modifications.

Policy 1F: Highway Mobility Standards Access Management Policy

This policy provides specific mobility standards for state highway sections, signalized intersections, and interchanges. Alternative standards are provided for certain locations and under certain conditions.

There is a Special Transportation Area (STA) designated in the study area. OR 47 is classified as a district highway for its entire length within the study area. The OR 47 study area intersections are located within the City of Vernonia Urban Growth Boundary (UGB), inside an area where the speed limit is 35 MPH or less. Applicable state mobility standards are listed in Table 1. In 2010 the City and ODOT coordinated their review of improvements at the intersection of Hwy 47 and Missouri Avenue for the proposed Vernonia K-12 school.

TABLE 1
State Mobility Standards on OR 47
Vernonia Transportation System Plan Update

Mile Post	Study Intersections	Speed Limit (MPH)	Planning V/C Ratio[1]
62.48	Bridge Street (OR 47) and Weed Avenue (Within the STA)	35	0.95
62.54	Bridge Street (OR 47) and Rose Avenue	20	0.80
62.60-62.66	Rose Avenue (OR 47) and Maple Street, Cougar Street	20	0.80

1 – 1999 Oregon Highway Plan (2006).

Policy 1G: Major Improvements

This policy identifies the state's priorities for responding to highway needs by directing agencies to take measures that are the least complex and typically most cost-effective changes to a roadway system. The priority measures in order of implementation are:

1. Protect the existing system;
2. Improve efficiency and capacity of existing system;
3. Add capacity to existing system; and
4. Add new facilities to the system.

The above measures will be integrated into the criteria against which all potential alternatives will be evaluated. In this way, the TSP process will ensure that recommended projects have been prioritized in accordance with this OHP policy. In general, the TSP update would recommend the addition of new facilities or capacity only when other, higher priority projects do not address the problem.

Goal 3: Access Management

Policy 3A: Classification and Spacing Standards

Access management balances access to developed land while ensuring movement of traffic in a safe and efficient manner. This policy addresses the location, spacing, and type of road and street intersections and approach roads on state highways.

Goal 3 is critical in transportation planning efforts that involve state transportation facilities. This goal is implemented through the Access Management Rule (OAR 734-051), which is discussed later in this memorandum.

Goal 4: Travel Alternatives

Policy 4A: Efficiency of Freight Movement

This policy addresses the need to move freight effectively using the state highway system, the need to provide sufficient access to intermodal connections, and the need to balance the needs of all freight movements with local transportation needs.

Although OR 47 is not a designated freight route through Vernonia, the highway is the sole source of access for through freight and vehicular traffic.

Goal 5: Environmental and Scenic Resources

The Environmental and Scenic Resources Policies recognize ODOT's responsibilities for maintaining and enhancing environmental and scenic resources in highway planning, construction, operation and maintenance.

TSP alternatives will be evaluated to determine potential impacts to environmental and scenic resources, such as the Banks-Vernonia Bicycle Trail and the water quality and scenic resources of the Vernonia Lake, Nehalem River and Rock Creek.

Statewide Planning Goal 12 (Transportation Planning Rule) (OAR 660-012)

The objective of the Transportation Goal (Goal 12) is a safe, convenient, multimodal and economic transportation system. Consideration of local and regional economies, social consequences, environmental impacts, energy, the needs of transportation disadvantaged, and over reliance on a single mode should be included in local plans. Guidelines for planning and implementation are included to support the Statewide Planning Goals. The TPR requires cities (with a population of 2,500 or greater) and counties to prepare and adopt a TSP.

The TPR requires local governments to adopt land use regulations consistent with county, state and federal requirements "to protect transportation facilities, corridors, and sites for their identified functions" (OAR 660-012-0045(2))."

The TPR has three key elements that guide planning[1]:

1. TSPs to support comprehensive plans – these are multi-modal assessments of needs, options and priorities developed at a community level
2. Criteria for Comprehensive Plan/zone changes that would alter a TSP
3. Guidelines for rural areas that differentiate them from urban areas for transportation planning

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.

To comply with the TPR, the City of Vernonia must adopt a TSP that complies with the Oregon Transportation Plan (OTP). Per the TPR, the elements that must be contained in a TSP are dependent upon the size of the local jurisdiction and whether the jurisdictional agency preparing the TSP is a Metropolitan Planning Organization (MPO). The TSPs of metropolitan areas and MPOs are required to include more elements than smaller cities. Vernonia is a city of approximately 2,370[2] and is not an MPO.

Per the TPR, elements that are required of the Vernonia TSP include:

- A determination of transportation system needs, including needs of the transportation disadvantaged and for movement of goods and services to support industrial and commercial development planned for pursuant to OAR 660-009 and Goal 9 (Economic Development)
- A road plan for a system of arterials and collectors which includes/addresses:

[1] *Oregon's Transportation Planning Rule Goes into the Shop for Repairs*, Ransford S. McCourt, August 2005

[2] Source: *2009 Oregon Population Report*, Portland State University Population Research Center: < http://www.pdx.edu/sites/www.pdx.edu.prc/files/media_assets/PopRpt09b.pdf>

  - Standards for the layout of local streets and other important non-collector street connections that must provide for safe and convenient bike and pedestrian circulation necessary to carry out OAR 660-012-0045(3)(b). Street standards must address extensions of existing streets; connections to existing or planned streets, including arterials and collectors and; connections to neighborhood destinations
  - Functional classifications of all roadways
  - Access management

- A public transportation plan which describes public transportation services for the transportation disadvantaged and identifies service inadequacies and; describes intercity bus and passenger rail service and identifies the location of terminals
- A bicycle and pedestrian plan for a network of bicycle and pedestrian routes throughout the planning area. The network and list of facility improvements must be in accordance with the requirements of ORS 366.514
- An air, rail, water and pipeline transportation plan which identifies where public use airports, mainline and branchline railroads and railroad facilities, port facilities, and major regional pipelines and terminals are located or planned within the planning area. For airports, the planning area shall include all areas within airport imaginary surfaces and other areas covered by state or federal regulations
- Policies and land use regulations for implementing the TSP as addressed in OAR 660-012-0045
- A transportation financing program as provided in OAR 660-012-0040

All of the above elements must contain an inventory and general assessment of existing and committed transportation facilities and services by function, type, capacity and condition

The updated Vernonia TSP will need to include transportation financing information containing the following:

- An updated list of planned transportation facilities and major improvements;
- A general estimate of the timing for planned transportation facilities and major improvements;
- An updated determination of rough cost estimates for the transportation facilities and major improvements identified in the TSP
- Funding sources

If the updated Vernonia TSP proposes an alternative which entails improvements being made outside the city's UGB, the actions would either need to be accordance with requirements of 660-012-0065 (Transportation Improvements on Rural Lands) or would require an exception in accordance with the stipulations of 660-012-0070 (Exceptions for Transportation Improvements on Rural Land).

Preparation of the updated Vernonia TSP will need to be coordinated with affected state and federal agencies, local governments, special districts, and private providers of

transportation services. Vernonia must amend its land use regulations to implement the updated TSP.

Access Management Rule (OAR 734-051)

OAR 734-051, commonly known as the Access Management Rule, defines the State's role in managing access to highway facilities in order to maintain functional use and safety and to preserve public investment. The Access Management Rule is the basis for providing improvements associated with development. The provisions in the Access Management Rule apply to all roadways under the state's jurisdiction. The Access Management Rule contains include spacing standards for varying types of state roadways and provisions for developments such as commercial centers. In Vernonia the Access Management Rule is relevant to OR 47.

The purpose of the 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 help achieve the following:

- Protection of resource lands
- Preservation of highway capacity
- Improved safety for segments of state routes with sharp curves, steep grades or obstructed sight distance.

The Access Management Rule establishes procedures and criteria used by ODOT to govern highway approaches, access control, spacing standards, medians and restriction of turning movements in compliance with statewide planning goals and in a manner compatible with acknowledged comprehensive plans and consistent with ORSs, OARs, and the Oregon Highway Plan (OHP).

Access Management Rule spacing standards will be used in the TSP to evaluate current access conditions.

Any new access proposed on OR 47 as part of the TSP update recommendations will need to comply with state spacing standards provided in OAR 734-051. Spacing standards should be reflected in the TSP and Public Works street design standards. These spacing standards vary depending on the posted speed of the facility, its location in an urban or rural area, and whether it has been designated as an expressway, UBA, or STA. Spacing standards applicable to OR 47 within the city limits of Vernonia are listed in Table 2:

TABLE 2
OAR 734-051 Spacing Standards Applicable to OR 47 in Vernonia

Type of Roadway	Speed	Spacing Standard (feet)
District Highway	30 and 35 MPH	350
District Highway (Within a STA)	30 and 35 MPH	Defers to the local Comprehensive Plan, public road connections are preferred over private driveways.

Source: Division 51 Tables

Highway Design Manual

The ODOT Highway Design Manual (HDM) outlines the design standards, policies, and processes to be applied on state highways. The ODOT HDM is closely aligned with the American Association of State Highway and Transportation Officials (AASHTO) "A Policy on Geometric Design of Highways and Streets - 2001." The ODOT HDM also identifies modifications to the AASHTO policy for certain specific design elements. Policies and standards to be applied are based on the jurisdiction (state and local), the functional classification, and the project type.

Project Relevance

The functional classification for OR 47 is a district highway, and specific standards from the HDM apply.

Access Management

Chapter 5 of the HDM identifies rules, laws, and techniques that designers can use when developing an access management strategy appropriate for Oregon State Highways.

Particular design elements of interest for the TSP update include access control and street design standards.

Urban Highway Design

Chapter 8 of the HDM identifies the design criteria for each of the elements of urban highway design (not freeway).

Particular design elements of interest for the TSP update include design speed, alignment and profile, shoulders, lane widths, cross slope, curbs, grades, vertical clearances, clear zones, traffic operations, and access management. The update will assure that city and state standards are consistent and/or can be modified by the City under certain conditions.

Pedestrian and Bicycle

Chapter 11 of the HDM outlines general guidance for bicycle and pedestrian movements. Other chapters provide additional or similar information on these design considerations.

The specific applications of these standards to OR 47, as a designated district highway, will be included in the TSP update.

Oregon Bicycle and Pedestrian Plan (1995)

The Oregon Bicycle and Pedestrian Plan provides guidance to regional and local jurisdictions for the development of safe, connected bicycle and pedestrian systems. The plan is a modal element of the OTP. It contains the standards used on state highway projects and provides guidance to cities in establishing facilities on local transportation systems.

The goal of the plan is the provision of safe and accessible bicycling and walking facilities for the purposes of encouraging increased levels of bicycling and walking. The plan provides actions that will assist local jurisdictions in understanding the principles 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 Plan. 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 and information on safety is provided. These standards are recommended but are not required for use by local jurisdictions in Oregon.

The Oregon Bicycle and Pedestrian Plan also addresses the Oregon Bike Bill (ORS 366.514). This law requires ODOT, counties, and cities in Oregon to expend reasonable amounts of the highway fund to provide bikeways and walkways. It also requires the inclusion of bikeways whenever roadways are constructed, reconstructed, or relocated – except in the following situations:

- There would be no probable use
- Safety would be jeopardized
- The cost would be excessively disproportionate to the need or probable use

The Vernonia TSP update should integrate the guidance of the Oregon Bicycle and Pedestrian Plan and recommended actions should include bicycle/pedestrian elements in accordance with the Bike Bill. Additionally, guidance will be used from this document to formulate the Safe Routes to School recommendations as included in the TSP update scope of work. Bicycle lane design and construction standards on the highway should be consistently defined in the TSP and city design documents. Alternative bicycle path designs are desired for the various conditions and locations in the city where standard bike lanes are not feasible or appropriate.

State Transportation Improvement Program (STIP)

The STIP is updated every two years and provides a 5-year state funding and scheduling guide for ODOT and the metropolitan planning organizations for transportation projects. Projects funded in the STIP reflect and advance the OTP for highways, public transportation, freight and passenger rail and bicycle and pedestrian facilities. STIP projects starting in 1998 to 2010-2013 for Vernonia are noted below:

1998-2001 STIP

- Anderson Park – Vernonia: Pave 8′ wide trail, construct a 12′ wide pedestrian/bike bridge across Rock Creek in 1999. (Total cost: $178,000) (Key number 06716)

2000-2003 STIP

- Vernonia NCL – Sunset Highway Junction Overlay Highway project in 2002. (Total cost $6,830,000) (Key number 11131).

2002-2005 STIP

- Vernonia NCL – Sunset Highway Junction Overlay Highway project in 2003 which includes significant bicycle and pedestrian elements, including adding sidewalk where possible. (Total cost $7,388,000) (Key number 11131).

2004-2007 STIP

- OR 47: Sidewalks/Bike Lanes – Texas Avenue to Riverside Drive in 2005. (Total cost $453,000) (Key number 13259)

2006-2009 STIP

- OR 47: Sidewalks/Bike Lanes – Texas Avenue to Riverside Drive in 2006. (Total cost $453,000) (Key number 13259)

2008-2011 STIP

- Banks-Vernonia Trail: South Trailhead Banks Road. Construction is scheduled to begin in 2008. (Total cost: $819,000) (Key Number 14771).

2010-2013 STIP

- Banks-Vernonia Trail: South Trailhead Banks Road. Construction is scheduled to begin in 2010. (Total cost: $1,046,000) (Key Number 14270).

These projects are expected to be completed, and are the only State-funded STIP projects included in Vernonia since 1998.

Columbia County Community-Wide Transit Plan and US 30 Transit Access Plan (2009)

The Transit Plan addresses current and future transit needs in Columbia County. The plan is designed to serve the needs of the major population centers of Scappoose, St. Helens, Rainier, Clatskanie, and Vernonia, along with the County's smaller communities and rural areas. The plan provides a set of recommendations for transit services throughout the

County, including fixed-route bus, demand-response bus, vanpool, and carpool, supported by transit facilities, including upgraded bus stops and new park-and-ride lots.

Currently, demand-responsive service is the only public transportation provided by the County to Vernonia.

Recommendations for additional transit service to Vernonia include:

- Fixed-route service to Hillsboro and PCC-Rock Creek
- Weekday flex-route between Vernonia and St. Helens via Scappoose

In the City's 1999 TSP, the document encourages the City's support of a dial-a-ride van service, but does not recommend additional public transit service. The Columbia County Transit Plan has a number of recommendations to change the TSP to support the transit plan:

The City of Vernonia should revise existing conditions information in the TSP to reflect current Columbia County transit planning. Background information that supports proposed policy should include current conditions in Vernonia, including the identified need for a park-and-ride. In addition, the transit plan recommended policy amendments to support the Transit Plan, and site new bus stops and park-and-ride lots within the City.

The plan recommends new fixed-route service from Vernonia to Hillsboro and PCC-Rock Creek and a weekday flex-route that travels from Vernonia to St. Helens via Scappoose three days per week and to Clatskanie via Mist the other two days per week. The plan calls for a park-and-ride area in Vernonia to support these new services, noting that park-and-ride spaces may be accommodated through on-street parking along the side of City Hall.

The following modifications to the development regulations of Title 9 are recommended to support the Transit Plan:

- Section 9-01.11-50.C of City Development Regulations (includes a list of transportation improvements that are permitted outright in any zone: "projects specifically identified in the TSP as not requiring further land use regulation." With the modifications to the City's transit policies, any transit improvements associated with the recommendations of the Transit Plan will be allowed outright.
- Section 9-01.11-70 Internal Connections requires walkways between adjoining developments and from commercial, office and institutional uses to public right of ways. No provisions in the city code address providing connections to public transit.
- Section 9-01.11-30 of the Development Regulations provides for the coordinated review of land use amendments and development proposals that potentially impact the transportation system; however the City does not explicitly require notification to Columbia County Rider.

The Transit Plan recommends the City modify notification procedures to provide for coordinated review with the County transit provider. The plan includes recommended language for development standards that require accommodating planned transit facilities

and providing safe and convenient access from commercial, office, institutional, and multi-family uses to public transit stops.

The Vernonia TSP will consider the recommended projects in the Transit Plan, and will strive to be in compliance with this document as required by the TPR.

Columbia County Rural Transportation System Plan (1998)

The County TSP provides the framework to guide transportation system development by addressing needs, funding resources, and implementation requirements to respond to future employment and residential growth. The TSP considers all modes of transportation, including vehicle, freight movement, public transit, walking and bicycling, transportation disadvantaged service, railroad, air, water, and pipeline transportation.

Elements applicable to Vernonia include a short discussion about the Vernonia airport, and the possibility of funding to upgrade the airport, and potentially reclassifying it to become eligible for inclusion in the National Aviation System Plan.

Projects authorized in 1996 near Vernonia include mention of the Anderson Park – Vernonia, Banks-Vernonia State Park. The project includes a paved 8-foot-wide trail and a 12-foot-wide pedestrian/bike bridge across Rock Creek that was included in the STIP. The Banks-Vernonia State Park paved and graded 8-foot-wide path for bicyclists and pedestrians. County projects in Vernonia should be incorporated and included as potential funding sources in the TSP.

City of Vernonia Transportation System Plan (1999)

The Vernonia TSP identified existing and future transportation system deficiencies, and included a list of projects to address the future transportation needs of the City. The following are the goals and policies of the TSP:

- Goal 1: Approval Process and Coordination – Develop a coordinated process for the Transportation System Plan
- Goal 2: Operation and Safety – Preserve and improve the function, capacity, level of service, and safety of the roadway system
- Goal 3: Transportation Alternatives – Support the use of other modes of transportation (bicycles, pedestrians, equestrians, and transit) through effective transportation improvements
- Goal 4: Air Transportation – Support efforts to maintain and investigate expansion of the airport facilities.
- Goal 5: Finance – Use a sound fiscal approach to financing transportation system improvements.

Existing Conditions

The 1999 TSP analyzed existing conditions in Vernonia, including the existing functional classification, roadway condition, state highway access conditions, traffic safety, posted speeds, on street parking, activity centers, new facilities, operations, and connectivity. The

existing facilities for bicycles, pedestrians, public transportation, and Regional transportation are also included in the 1999 TSP.

The TSP update will verify that these conditions still exist and update data when necessary.

Future Conditions

The 1999 TSP analyzed future (year 2018) conditions by assuming full buildout of developable land within the current UGB land, and added the projected future trips from expected development to the traffic analysis.

The TSP update will need to consider land that has been added to the floodplain and areas that will be acquired by the City and kept as open space to mitigate future flood events. The update will also consider developments currently under consideration in the City, including the relocation of the schools, the relocation of the Western Oregon Electric Coop headquarters building, and the proposed Nehalem View Subdivision. The TSP will also evaluate the traffic impacts of a City plan to extend the Downtown Zone DT south onto Rose Avenue.

Additionally, there are some streets and other areas that have been added to the City's UGB since the last TSP, and those areas and streets will need to be considered in the TSP update. There are also a number of recommendations in the 1999 TSP that have already been implemented or may no longer be needed. Recommended projects will be updated through this TSP effort.

The TSP update will evaluate the recommendations in the 1999 Vernonia TSP, and update the existing and future traffic conditions based on recent data. The TSP update may revise or discard some of the recommendations that have been implemented or are no longer considered necessary.

City of Vernonia Comprehensive Plan (1995-1996)

The City's Comprehensive Plan is the generalized, coordinated land use map and policy statement for the City. It establishes the land use planning process and policy framework to base all land use decisions and actions to ensure an adequate factual base for such decisions.

Goals of the plan include guiding development in Vernonia in a rational manner, allowing for a high quality of development in and around the City. The City supports modest growth, but the first priority is projects and programs that maintain the City's livability and friendly character. An additional goal added in response to the 1996 flooding was to emphasize the location of development out of floodways, and to remove severely damaged and obsolete structures from the floodways to create a floodway-protecting greenbelt system.

Objectives relevant to the TSP update include:

- Park and recreation sites and facilities will be improved and expanded to include:
    - Extension of the Banks-Vernonia Linear State Park to Lake Vernonia and establishment of the park's trail-head facilities at the lake
    - Establishment of a Shay railroad route with a station in downtown and supporting display, museum and operation and maintenance facilities

- Transportation facility improvements including City streets, State and County access routes and development of the City's airport will provide key support to the overall improvement of the City's economy

In addition to the objectives outlined in the Comprehensive Plan, there are also some streets specifically mentioned in the document:

- The Comprehensive Plan identifies State Street and Pebble Creek as County roads, classified as collector streets.
- City collectors within Vernonia include: Rose Avenue north of Bridge Street, Bridge Street west of Rose Avenue, Adams Avenue from Bridge Street to Anderson Park, and Cougar Avenue and 2nd Street connecting to Baker Road.
- Knott Street from OR 47 east is designated as a special combined light industrial-residential service street.
- Maple Avenue from Adams to Weed and Weed Avenue from Maple to Bridge are designated as special commercial service streets.

Street and Roads Policies include:

- Continued maintenance of OR 47 by ODOT is required. The City will coordinate with ODOT to safely accommodate heavy truck traffic through the City.
- The City supports the Banks-Vernonia Linear State Park.
- The City continues to adopt Columbia County street and road improvement standards as a means of insuring new and existing roads and streets meet the City's transportation needs.
- New road and street proposals will be in accordance with the requirements of the subdivision ordinance
- The City's zoning ordinance will host requirements for off-street parking and loading and vehicular maneuvering space.
- The Planning Commission will work with downtown business people to review and recommend changes in on-and off-street parking and loading space arrangements.

The Comprehensive Plan is in need of updating, as it is a collection of information dating from the 1970s, and should be updated to ensure that it is compatible with County, State and regional plans, along with other plans within the city itself.

The TSP update will suggest amendments to the Comprehensive Plan to bring both documents into compliance and to ensure that there are no inconsistencies between the two.

City of Vernonia Zoning Code and Public Works Standards

The City Zoning Code is the guide for the type of development that is allowed either outright or conditionally in any given zoning designation. Zoning ordinances implement Comprehensive Plan policies and preserve the nature of the community, and provide for public facilities provision to serve the population.

City of Vernonia Public Works Design Standards, Section 6 Public Works Street Standards

Section 6 lays out the design requirements of City streets, including performance standards and guidelines. Traffic analyses requirements are included, along with report contents to be submitted to the Office of Public Works. Intersection spacing, half street construction, design speed, horizontal and vertical curve standards, design, and curb requirements are also included in the standards. The standards include sidewalk width requirements on various street types and adjacent to different types of land use. Standards for wheelchair ramps, parking, bikeways, and accesses can be found in this document section. These requirements vary from the 1999 TSP and Section 9-01.11 of the City's code. The differences are described below:

- City code requires a traffic impact analysis if the proposed development will generate more than 300 trips per day, while the public works standards require a TIA if a development will generate more than 1,000 trips per day.
- Public works guidelines require exclusive left and right turns lanes provided at arterial intersections, while section 9-01.11 does not require exclusive turn lanes.
- Public works intersection spacing for collectors and local streets are 400 and 300 feet, respectively, while section 9-01.11 requires 300- and 200-feet spacing for the same types of roads.
- Parking requirements on collectors in the public works standards is higher than the requirements in section 9-01.11, and is different for local roads.
- Local street right-of-way requirements call for 40-foot right of way in the public works standards, while section 9-01.11 calls for 30-foot right of way.
- Minimum sidewalk width in the public works standards is 6 feet for an arterial, while in the 1999 TSP, the requirements are 10 feet for arterials in an urban environment, and 5 feet for rural arterials
- The minimum width for bikeways on a public street in the public works standards is 8 feet, while the TSP calls for 5-foot bikeways on streets. These also need to be compared with state bikeway standards.

Title 9 Land Use and Development

This is the Zoning Code for the City of Vernonia. There are a number of zones throughout the City, including various residential designations of differing density, commercial and downtown designations, industrial, public recreation and institutional public designations. A zoning map accompanies the zoning code to identify the location of zones within the city. Additionally, zoning lays out design standards, building setbacks, lot orientation and side and rear yard requirements.

Section 9-01 Zoning Code for the City of Vernonia

Residential Zone (R)

The Residential zone provides standards for residential purposes, and includes single family and two family uses, farming, and home occupations described in the zoning code. Conditional uses include community facilities such as churches, community buildings,

governmental use, medical services, mobile home parks, schools or colleges, public utility structures, parks or playgrounds, or bed and breakfast inns. The Residential zone expressly prohibits the use of an automobile travel trailer as a residence on individual lots.

General Residential Zone (GR)

This zone provides minimum development standards for a variety of housing opportunities in close proximity to community services in the downtown zone. Various housing types are permitted outright, including multi-family housing, boarding, lodging, or rooming house, care facilities or homes, and community gardens. Conditional uses are similar to the Residential conditional uses.

Low Density Residential Zone (LDR)

This zone provides a transition area between high density and rural areas with few natural boundaries. All development within this zone is reviewed as a Planned Development. Single family housing, farming, and home occupations are allowed outright. Conditional uses include churches, community and government uses, schools, public utilities or public parks and playgrounds.

General Commercial Zone (GC)

This zone provides for a broad range of commercial operations and services required for proper and convenient functioning of commercial centers serving large areas of the county. Permitted uses include all retail and service operations including retail or wholesale trade, repair or maintenance service, office, personal or business services, eating or drinking establishments, financial institutions, and amusement institutions. Conditional uses include public or private athletic fields, RV parks, railroad or other transportation facility passenger depot, public or semi-public buildings, single or multiple family dwelling units located on the second story of a permitted use, and a manufactured home park.

Downtown Zone (DT)

The Downtown zone exists to identify an area of the city as a vibrant commercial center with special uses, development types and design, different than the General Commercial designation. The Downtown zone is the "heart" of the community, allowing for places for people to gather, and the civic and business center. The goal is to use land and urban services efficiently, have a mixture of uses to encourage walking, and provide formal and informal community gathering places, and have a distinct storefront character that identifies the downtown zone.

Permitted uses include existing detached dwellings, multi-family dwellings attached (above or behind) to a permitted non-residential use, home occupations, bed and breakfast establishments, churches, community buildings, government offices and facilities, public buildings, private utilities, entertainment within buildings, medical and dental offices, office uses, personal and professional services, repair services, mixed-use development, and retail trade and services, except auto-dependant uses.

Conditional uses include hotels, day care, and light manufacturing or similar uses. Buildings are required to be oriented to the street and pedestrian friendly areas to create a walkable downtown. Height limits may be extended if the building is mixed-use.

Light Industrial Zone (LI)

The purpose of this zone is to provide for manufacturing, warehousing, and sales operations which do not create objectionable amounts of noise, odor, dust, glare, vibration, or track or rail traffic.

Permitted uses include transmitter and utilities facilities, repair and maintenance activities, animal hospitals, wholesale, trucking and storage establishment, machine and cabinet shops, building material storage yard, plumbing, heating, electrical or paint contractors storage, repair or sales shop, tire re-treading or vulcanizing shop, forest materials processing, and other uses that do not create excessive noise, smoke, odor, or gas and do not constitute a fire, explosion or other physical hazard. Conditional uses include automobile wrecking yards, junk yards, dwelling unit accessory to a permitted use, or biomass electrical generation facility.

Public Recreation Zone (PR)

This zone allows parks and playgrounds, athletic fields, swimming and wading pools, golf course, tennis courts, picnic areas, campgrounds, RV accommodations, historical displays, museums, community buildings, and open space areas, greenways and greenbelts. Conditional uses include expansion of permitted uses.

Planned Development Zone (PD)

The Planned Development zone is used only in combination with another zone, and allows the application of new technology and greater freedom in design in land development than is possible in a strict interpretation of the code. The plan should be consistent with the Comprehensive Plan for the area. Planned developments should be approved in accordance with the provisions of this section. Planned development zone may be established in combination with any other zone, however, residential uses are not permitted in an LI zone, and uses permitted in an LI zone shall not be permitted in an R, GR, LDR, DT, or GC zone.

Institutional Public Zone (IP)

This zoning district provides for major institutional and government activities such as schools, public parks, government offices, utility structures, hospitals, correctional facilities, and other similar public and quasi-public uses. All uses are considered a conditional use in the IP zone, and a number of conditional uses are allowed. The only prohibited uses are private lodges, fraternal organizations, country clubs, or similar clubs.

Section 9.01-11 Transportation Planning, Standards and Procedures

This section is applicable to the TSP update, as it provides standards and procedures to implement the TPR and local, regional, and state transportation plans. Notice is required to DLCD if there is a proposal to amend the Comprehensive Plan or zoning code.

This section also describes the access management standards applicable in Vernonia. ODOT approval is required for an access onto OR 47, and must be in compliance with the access management strategies in the 1999 Vernonia TSP. To create a new access onto a County road, property owners must notify and coordinate with the Columbia County Public Works Department, and access onto local streets must comply with the Vernonia TSP.

Minimum access spacing is included in Table 3 below:

TABLE 3

Access Spacing Standards by Roadway Functional Classification

Functional Classification	Minimum Access Spacing
Arterial	500 feet from arterial or collector
	400 feet from any other intersection (including private access)
Collector	300 feet from arterial
	150 feet from any other intersection (including private access)
Local Street	200 feet from arterial
	100 feet from any intersection with a collector, or local street
	No spacing requirements from intersections with a private access

Section 9-01.11-40 Protection of Transportation Facilities

All Comprehensive Plan and zone changes shall conform to the adopted Vernonia TSP, and should not substantially impact the functional classification or operation of transportation facilities. A traffic impact study (TIS) or a traffic impact analysis (TIA) may be required for a comprehensive plan or zone change to quantify the impacts to the local transportation system. To ensure the function of the transportation network, the City may limit allowed land uses to be consistent with the planned function, capacity and level service of the transportation facility, may amend the TSP to provide transportation facilities adequate to support the proposed land uses, or may alter land use designations, densities or design requirements to reduce demand for auto travel and meet travel needs through other modes.

Section 9-01.11-50 Transportation Improvements

No plan amendments are needed if the improvement lies within a corridor identified in the TSP. The following transportation improvements are permitted outright in any zone including normal operation, maintenance, repair, and preservation activities on transportation facilities, projects identified in the TSP not requiring further land use regulation, landscaping, and acquisition of right-of-way for public roads, highways, and other transportation projects identified in the TSP. Transportation improvements conditionally allowed include construction, reconstruction or widening of facilities not identified in the TSP or not designed and constructed as part of a subdivision or planned development.

Section 9-01.11-60 Street Standards

The City's zoning code defers to the TSP for street standards, noting that new developments shall provide for street connectivity. Street Standards are found in Table 4 below:

TABLE 4
Street Standards in TSP and referenced in Transportation Planning Standards, City Code

Street Type	Travel Lanes	Parking	Bikeways	Total Pavement	Unpaved shoulders	Planting Strip	Sidewalks	Right-of- way[1]
Urban								
New Local	2 – 9'	5' both sides		28'	5' both sides	5' both sides		50'
Local preferred retrofit	2 – 9'	6' one side		24'		5' both sides	5' both sides	46'
Local Minimum retrofit	2 – 9'			18'			5' one side	25'
Collector	2 – 10'	8' one side	5' both sides	38'		5' both sides	6' both sides	62'
Arterial	2 - 11'	8' both sides[2]	5' both sides	48'			10' both sides[3]	70'
Rural								
Local	2 – 9'			18'	2' both sides			30'
Collector	2 – 10'	6' one side	5' both sides	36'	4' both sides		5' both sides	62'
Arterial	2 – 12'		5' both sides	34'	4' both sides		5' both sides	60'

[1] Required right-of-way is the total of pavement, shoulders, planting strip, and sidewalks, plus 2 feet for urban roadways and 8 feet for rural roadways
[2] Standards for urban arterials and collectors require 8 foot parking lanes in the downtown area, where storefront commercial land uses make on-street parking desirable. Outside of downtown, parking lanes may be excluded from the cross section if adjacent land uses do not support the need (for instance, if buildings are set back from the right-of-way and off-street parking). Where on-street parking is eliminated from the cross section, total pavement width shall be reduced by the same amount.
[3] The 10-foot arterial sidewalk is stipulated for downtown area and may be reduced to 6 feet elsewhere.

Section 9-01.11-70 Internal Connections

Internal connections are required as walkways from the public right-of-way or adjoining development to main building entryways. Multi-family developments and planned developments must also include internal connections, including connections to the right-of-way and adjacent developments.

Section 9-01.11-80 Bicycle Parking Facilities

Bicycle parking is required in all new multifamily, industrial, commercial, office, and institutional development. Parking must be near a primary entrance, may be located on sidewalks if there is enough width to serve both bicycles and pedestrians, and there are specific parking space requirements depending on the type of development.

Section 9-01.11-90 Traffic Impact Studies

This section establishes standards for when a land use proposal must be reviewed for potential traffic impacts, and when a TIS must be submitted as part of a development application[3]. A TIS is required in the event of a zoning change or plan amendment designation, the proposed development or land use action may have operational or safety concerns, and increase in traffic volume generation by 300 average daily trips or more, an increase in peak hour volume to and from a State highway by 20 percent, an increase in adjacent street use, driveway locations do not meet sight distance requirements, or a change in internal traffic that may cause safety problems.

Section 9-04 Sidewalks

The Sidewalk section defines sidewalks and instances when sidewalks are required within the City of Vernonia. It also describes when sidewalks are not required, including physical limitations, and if other surrounding property does not have sidewalks. Conditions requiring sidewalk construction include: the adjacent street has been fully developed to City standards, existing sidewalk on properties immediately adjacent to the property, the property is identified in the Comprehensive Plan as requiring a sidewalk, the presence of a school, or other public facility, in the area it would be in the interest of public safety to have a sidewalk installed, and the topography of the area would not prevent reasonable installation of a sidewalk.

Other Provisions that Could Affect the TSP Update

There are provisions related to street improvements in pre-platted areas and land divisions. Also, every lot is required to abut a street, other than an alley, for at least 25 feet. There are off-street parking and loading requirements, and owners of two or more uses are allowed to jointly utilize the same parking and loading spaces if hours of operation do not overlap.

The Vernonia TSP update may consider additions or edits to the City code to bring everything into compliance and ensure that all the standards are consistent throughout.

Vernonia School Siting Study: Comparative Assessment of Transportation Needs (2009)

In February last year, a report was written (*School Siting Comparison Report*, Kittelson & Associates, 2009) to analyze the transportation infrastructure needs of alternative sites for the Vernonia K-12 school campus. Two alternate sites were analyzed in response to the need to move the existing schools out of the floodplain. The two sites are the Northwest Corner Site and the Boot Site.

Northwest Corner Site

The Northwest Corner Site is currently outside of the City's UGB boundary in the northwest corner of the city, adjacent to a cemetery and single-family housing. The site is on a hill, which is currently connected to the City by a dirt road. The site is hilly and densely forested. Two site access options were identified in the study: Bridge Street widening and Rose Avenue Extension. Both streets would need to be upgraded to support access to the potential school site, with sidewalks and bicycle facilities to allow for pedestrians and

[3] Traffic Impact Analyses (TIA) and Traffic Impact Studies (TIS) are used interchangeably throughout this document. They are the same type of analysis

bicycles to share the roadway. The northwest site does not offer any pedestrian or bicycle-only transportation options, and is more remote than the existing schools, requiring more students to be dropped off or to take the bus.

The report observed that the Northwest Corner Site has very little transportation infrastructure, and major transportation improvements would be required if this site were chosen. Steep terrain and limited right-of-way could increase unforeseen costs as more detailed engineering work was completed.

Boot Site

The Boot Site is also an unincorporated section of town between Louisiana Avenue and the Nehalem River outside of the UGB. Adjacent to the site is Spencer Park, single family housing and the river. Three site access options were analyzed in the study: Missouri Avenue Widening – uses Missouri Avenue to provide the primary access; Texas Avenue Widening – uses Texas Avenue to provide primary access; and North Boot Site Access – uses State Avenue to Stoney Point Road north of Vernonia to Mellinger Road, and then south along a newly constructed road into the school site. Both Missouri and Texas Avenues would need to be widened and improved to support the Boot Site for either alternate route, and the Boot Site access would require new roads and alterations of both Mellinger and Stoney Point Roads. For all three alternatives, a left-turn pocket would be required on Bridge Street to accommodate vehicles turning on State, Missouri, or Texas Avenues.

The report notes that the Boot Site is well located and has a number of access routes for pedestrians. The Missouri and Texas Avenue options would simply require a widening to support sidewalks and bicycle lanes to the Boot Site, but the Boot Site access around the north may require a separate bicycle and pedestrian facility to be built to provide access from Bridge Street.

The report concluded that the transportation options associated with the Boot Site were more feasible, and the Boot Site was easier to access for pedestrians and bicyclists. The required access improvements for the Texas and Missouri Avenue options were relatively low cost and could be implemented.

The Vernonia TSP update recognizes that two alternatives were considered as part of the school siting process, and will consider the recommendations and issues brought up in this study.

Vernonia School Campus Transportation Impact Analysis (2010)

This traffic impact analysis (TIA) was conducted in March of 2010 in response to the potential Boot Site school location being chosen north of Bridge Street on Missouri Avenue, and based on previous work for the *School Siting Comparison Report* (Kittelson & Associates, 2009).

The study analyzed two study area intersections: Bridge Street and Missouri Avenue, and Bridge Street and Texas Avenue. The analysis found that a left-turn lane is warranted at the Bridge Street and Missouri Avenue intersection when the school is developed; however, a signal at this intersection is not warranted. The TIA found that safe and effective transportation can be provided to the site for all modes of travel.

Recommended mitigation for the school development are as follows:

Bridge Street Improvements

- Install an eastbound left-turn lane at the Bridge Street/Missouri Avenue intersection providing 100 feet of storage length in order to accommodate 95th percentile queues
- Install a pedestrian refuge on the east leg of the Bridge Street/Missouri Avenue intersection (in lieu of an opposing westbound left-turn lane)
- Eliminate parking on the southbound approach for at least 125 feet north of the Bridge Street/Missouri Avenue intersection to provide room to separate right- and left-turning traffic
- Do not install a westbound right-turn lane at the Bridge Street/Missouri Avenue, thereby promoting pedestrian safety at the intersection (by reducing the distance required to cross bridge street)
- Extend the 25-mph speed zone (which currently transitions to 35 mph on OA Hill west of Texas) to about 500 feet east of Missouri Avenue

Bicycle and Pedestrian Improvements

- Retain bike lanes on Bridge Street between Texas and Missouri Avenue
- Install a multi-use pedestrian-bicycle path along the south side of Bridge Street between Texas and Missouri Avenues
- Provide pedestrian and bike facilities along Missouri Avenue between the new school site and Bridge Street as well as at the Bridge Street intersection
- Provide a pedestrian connection from the new school site to the city center of Vernonia
- Provide bus service to all students who reside west of Ora Bolmeier City Park and all students who live greater than one mile from campus;
- Install school zone signage and flashing beacons to alert drivers of potential pedestrians along Bridge Street in the vicinity of Missouri Avenue;
- Staff the Bridge Street crosswalk at Missouri Avenue with crossing guards before and after school, flagging traffic to protect students;
- Provide pedestrian-bicycle connectivity from the school campus via local streets to the neighborhood immediately west of the campus (state street neighborhood);
- Provide an emergency vehicle and pedestrian-bike connection linking the school campus to Texas Avenue; however, do not allow general traffic use (enforced by installing bollards), and;
- Prepare a special events plan, and coordinate with adjacent churches prior to each school year to ensure that heavily-attended events are not scheduled concurrently;

- In the future, the School District should collaborate with the City of Vernonia to further enhance pedestrian and bicycle connectivity. This should include the School District's active participation in the City's upcoming Transportation System Plan development and pursuit of grant funding through the State and federal Safe Routes to School programs.

The TSP update will consider the recommendation in the TIA and the left-turn lane recommendation for Bridge Street at Missouri Avenue. (The Planning Commission has made a final decision on school transportation improvements; these are found in the decision notice for File # CUP/SD 10-01.)

Western Oregon Electric Co-Op (WOEC) Relocation TIA (2010)

In addition to the school relocation in response to the 2007 floods, the Western Oregon Electric Co-Op will be relocating their headquarters between Weed Avenue and Rose Avenue south of Bridge Street. Per development code, they were required to complete a traffic impact study. The TIA for the WOEC relocation was prepared in May of 2010.

The TIA assumed that Cougar Street will be constructed between Weed Avenue and Rose Avenue and will serve as the major access for all development.

Other traffic assumptions include:

- Maple Street as a two-way street between Rose Avenue and Weed Avenue, maintaining a 28-foot paved width and sidewalk on the south side of the street
- Cougar Street as a two-way street between Rose Avenue and Weed Avenue to serve the future WOEC headquarters and City facilities development. At a minimum, prior to occupancy of the site, Cougar Street must be two-way from the headquarters driveway to Weed Avenue and one-way westbound from the WOEC headquarters driveway to Rose Avenue.
- Umatilla Street between Rose Avenue and Weed Avenue will be closed and possibly vacated due to sight distance issues at Umatilla Street and Rose Avenue.
- Weed Avenue will remain a one-way street between Bridge Street and Maple Street for the short term. The study recommended for the long term, plans to reopen Weed Avenue to two-way traffic, which should be incorporated into the City's Transportation System Plan update.
- The analysis assumes no new access on Rose Avenue either from WOEC headquarters or the City site.
- Cougar Street is assumed as the access road to the proposed facilities. All existing and proposed public approaches to the highway will require new access permits from ODOT.

No traffic impacts for congestion or safety issues were identified in the report as a result of the WOEC and City development, and no mitigation improvements are expected to be required.

The TSP update will consider the recommendations and expected improvements associated with the WOEC facility location and traffic impact analysis.

Nehalem View Subdivision Traffic Impact Study (2008)

The proposed Nehalem View Subdivision is located in the northeast part of the city, west of the Nehalem River and south of the northern city limits. Access to the site will be through new streets connecting Mellinger Road from the north and Riverside Drive from the south. The subdivision will be developed in three phases, each a year apart. Phase 1 includes 24 units, phase 2 has 23, and phase 3 will be 20 units. The fully developed subdivision will be 67 single-family residential homes.

As required by City code, the subdivision completed a TIS, where future traffic related to the subdivision was analyzed and the amount of congestion determined on City roads. The study area intersections include Stoney Point Road and State Avenue (this intersection is in the county), Highway 47 and State Avenue, and Highway 47 and Riverside Drive.

The study determined that 50 new trips would be generated by the fully completed development in the morning peak hour, 67 trips during the evening peak hour, and 642 new trips daily. All of the study intersections operate within standards currently, and are projected to operate acceptably once the development is built. This additional traffic is not expected to decrease the level of service below current standards, and traffic projections show that there are no traffic concerns in the future year without the development.

According to the TIS, the Nehalem View development and associated increase in traffic meets a left-turn lane warrant on OR 47 at State Avenue. However, there is limited area available to add a turn lane, and the installation of a turn lane is recommended once properties near the intersection redevelop. Once this redevelopment occurs, the proportional share is recommended to be made part of this development.

An additional recommendation includes the removal of vegetation along OR 47 to improve sight distance for vehicles turning off of Riverside Drive. No other safety deficiencies were identified.

The recommendation to add a left-turn lane at OR 47 and State Avenue will be considered as part of the TSP update process.

City of Vernonia Local Wetland Inventory and Riparian Assessment (2000)

The assessment documents the methods and results of the City's Local Wetland Inventory (LWI). The City was required to complete the assessment as part of the requirements for the periodic land use planning review process established by State Land Use Planning Goal 5, and the City suspected wetlands existed on large areas zoned for development. The assessment used the following three criteria to determine the presence of wetlands: presence of wetland hydrology, hydrophytic vegetation (vegetation that occurs where inundation or soil saturation produce permanently or periodically saturated soils), and hydric soils (soils that are saturated, flooded, or ponded during the growing season to support hydrophytic vegetation) under normal conditions.

The study mapped 18 water resources within the UBG totaling 131.37 acres. These water resources included 15 palustrine wetlands, one lacustrine wetland, and two riverine wetlands.

Palustrine Forested wetlands include all nontidal wetlands dominated by trees, shrubs, plants, or mosses or lichens. Palustrine forested wetlands are the majority of wetlands within the UGB and vary from major stream drainages to more isolated sites in low areas or near the bottom of slopes. There is forested wetland in the northeastern corner of the city, and in some residential areas east of the Nehalem River. There are some smaller wetlands near the eastern edge of Spencer Park and east of the Washington Grade School. There are also wetlands along the Nehalem River near Vernonia Lake, west of Rock Creek, adjacent to Bear Creek in the southwestern area, and a few isolated locations west of Rock Creek.

Palustrine Emergent wetlands vary throughout the study area. The largest one is in a wet meadow area in the northeastern corner of the UGB. There is also a fringe area of emergent wetland around the edge of Vernonia Lake. A ponded section of Bear Creek in the southwestern part of the UGB, along with areas along Knickerson Creek in the northeastern part of the UGB were identified as emergent wetlands. Additionally, a northern section of Spencer Park, and an area east of Anderson Park near the water treatment facility are emergent wetland areas.

Palustrine Scrub/Shrub wetlands are located in two areas within the UGB: the northeastern area north of Knickerson Creek, and a previously identified area between the sewage treatment ponds and Vernonia Lake.

Lacustrine wetlands are associated with large standing water bodies. Within Vernonia, lacustrine limnetic open water wetland is located in Vernonia Lake.

Riverine lower perennial open water wetland is located in the channels of Nehalem River and Rock Creek. These streams are characterized by low gradient and low water velocity.

The TSP update will consider wetlands when developing projects and transportation alternatives.

APPENDIX C

EXISTING CONDITIONS

Existing Conditions and Needs: City of Vernonia Transportation System Plan Update

PREPARED FOR: Carole Connell, City of Vernonia
Bill Haack, City of Vernonia
Seth Brumley, ODOT

PREPARED BY: Joshua Johnson, CH2M HILL
Tegan Houghton, CH2M HILL
Elliott Akwai-Scott, Alta Planning + Design
Terra Lingley, CH2M HILL

COPIES: Larry Weymouth, CH2M HILL

DATE: November 2, 2010 Revised November 16, 2010

This memorandum describes existing conditions and needs in the Vernonia TSP Update project study area. The focus is on deficiencies in existing transportation facilities as well as concerns related to existing safety and congestion, and updates the information found in the 1999 City of Vernonia TSP. Where applicable, this memorandum will identify where information has been updated from the 1999 TSP document. This memorandum is divided into five parts: existing transportation facility inventories, land use inventories (base and future year), existing traffic conditions, an analysis of Safe Routes to School, and issues identified at the first Project Advisory Committee and Project Management Team joint meeting.

Background

The City of Vernonia is located in central Columbia County, 22 miles west of Scappoose and 28 miles south of Clatskanie on OR 47. Vernonia is a former timber town located between Portland and the Coast Range, and has approximately 2,370 residents[1]. In the past 15 years, Vernonia has experienced two serious flood events; one in 1996 and 2007. As a result of the most recent flooding--which damaged the elementary, middle and high schools--the Vernonia School District, Transportation and Growth Management (TGM), and Oregon Solutions have identified a new school site with the intention of replacing the existing schools. The school district and the City are dedicated to meeting the objectives of the Safe Routes to School Program. In addition to bicycle and pedestrian safety, it is important to create safe, efficient school bus routes and vehicle access. Identifying existing or new streets and pathways to serve the new school site is important to the community.

In addition to addressing and connecting the new school site, the TSP update will emphasize multi-modal transportation, in line with the community's values. The TSP

[1] From the 2009 Oregon Population Report and Tables. Portland State University Population Research Center. Available at http://www.pdx.edu/prc/. Accessed September 2010.

update will also address roads that are now within the City's urban growth boundary (UGB) since expansion after 1999. A road conditions analysis will also be conducted as part of the TSP update to provide a baseline and prioritize improvement projects and to help determine future funding sources.

Study Area

The study area is bounded by Vernonia's city limits and the City's UGB, whichever is larger (Figure 1). This figure replaces Figure 1-2 of the 1999 TSP. Existing zoning for the City is shown in Figure 2. Community facilities are shown in Figure 3.

Inventory of Transportation Facilities

Roadway Jurisdictions

Oregon Highway 47, the Nehalem Highway, is the only State-owned roadway in the City. This highway has several names within the city limits and is a designated arterial on Rose Avenue from the south city limits to Bridge Street, on Bridge Street from Rose Avenue to Mist Drive, and on Mist Drive from Bridge Street to the north city limit.

The following roadways are City-owned and designated collectors: State Avenue from Bridge Street to the north city limit, River/Cougar/2nd Street, Rose Avenue north of Bridge Street, Louisiana Avenue, Nehalem Street, and Knott Street. All other roadways in Vernonia are City-owned and designated local streets. This updates the Functional Classification section of the 1999 TSP.

Pavement Conditions

The pavement of Highway 47 is uniformly in excellent condition (looks new) from the south city limits at Rose Avenue and River Street to Bridge Street and State Avenue. To the east as far as the river, the pavement of Bridge Street (Highway 47) is generally in excellent-to-good condition, with the pavement nearest the bridge in good-to-fair condition. On the east side of the river, the pavement condition of Mist Drive (Highway 47) is generally good.

The pavement condition of State Avenue from Bridge Street to "C" Street is poor. However, from "C" Street north to Stoney Road, pavement condition is excellent.

Land Use Inventory

The draft City of Vernonia Buildable Lands Inventory is being finalized concurrently with the Vernonia TSP update. This study includes existing land use information and serves as the basis of the information provided in this section. The report draws on information from the City's geographic information system (GIS) database, County Assessor tax lot data, flood maps, and the City of Vernonia Local Wetland Inventory and Riparian Assessment.

The current acres of land within the Vernonia Urban Growth Boundary (UGB) is displayed in Table 1, and is broken down by zoning designation and the number of tax

lots within each zone. Over 70% of the land within the Vernonia UGB is zoned for residential uses, 19% is zoned for commercial and industrial uses, and 8% is zoned for parks and recreational uses.

TABLE 1
2009 Total Vernonia Land by Zone

Zone	Number of Taxlots	Acres	Percent of Total Land Supply
Residential (R)	965	501.76	54%
General Residential (GR)	277	117.85	13%
Low Density Residential (LDR)	3	62.92	7%
Light Industrial (LI)	21	103.34	11%
Public Recreation (PR)	11	74.55	8%
General Commercial (GC)	45	57.77	6%
Downtown (DT)	81	13.61	1%
Totals	**1,403**	**931.6**	**100%**

Source: Draft City of Vernonia Buildable Land Inventory (2009)

According to US Census data, in 2000 Vernonia had 880 housing units and 789 households. According to City geographic information system (GIS) parcel data, Vernonia currently has 943 homes. Vernonia's current housing is dominated by single family residential.

Buildable Lands

According to OAR 660 Division 8, "buildable land" means residentially designated land within the urban growth boundary, including both vacant and developed land likely to be redeveloped, that is suitable, available, and necessary for residential uses. Publicly owned land is generally not considered available for residential uses. Land is generally considered "suitable and available" unless it is:

- Severely constrained by natural hazards as determined under Statewide Planning Goal 7
- Subject to natural resource protection measures determined under statewide Planning Goals 5, 15, 16, 17, or 18
- Has slopes of 25 percent or greater
- Is within the 100-year flood plain; or
- Cannot be provided with public facilities

The acreage of land within the UGB is described in Table 2, broken down by zoning designation and by land development class. Each class of land is described below:

- **Developed:** A tax lot is considered developed when it is built to its zoned density

- **Vacant:** A tax lot is considered to be vacant when there is no improvement on the values. Vacant lands do not include tax lots that are below 5,000 square feet since those lots do not meet the minimum size for development.
- **Redevelopable:** A tax lot is considered redevelopable when the property is developed but has a low improvement value. For this inventory, residential low improvement value is when the value per square foot is below $10. This was determined by dividing the improvement value by the land value. If that number was below $10 per square foot the lot was deemed redevelopable.
- **Infill:** A tax lot is classified as infill, if the lot is developed but has sufficient land left available to build at least one other dwelling unit. To simplify this process a developed lot must be greater than .5 acres to be considered a candidate for infill development.
- **Constrained:** For this inventory, a tax lot was considered constrained if it is in a floodway, floodplain, wetland, or is government owned. According to the Vernonia public works department, all developed property within city limits are currently served by water and sewer and all undeveloped properties within the UGB can be served by water and sewer, so no development constraints exist related to the provision of public facilities.

TABLE 2
2009 Total Vernonia Land by Class and Zone

Zone	Developed	Vacant	Redevelopable	Infill	Constrained	Total
R	115.2	114.43	14.95	46.67	210.51	501.76
GR	18.16	8.69	1.94	4.59	85.21	118.59
LDR	0	24.43	0	0	38.57	63
LI	3.41	3.49	0	34.16	62.42	103.48
PR	0	0	0	0	74.55	74.55
GC	0.44	1.38	0.29	0	54.72	56.83
DT	9.88	0.15	0	0	3.39	13.42
TOTALS	**147.09**	**152.57**	**17.18**	**85.42**	**529.37**	**931.6**

Source: Draft City of Vernonia Buildable Land Inventory (2009)

Table 3 is a list of buildable lands within the UGB. To calculate the amount of buildable land within the UGB, the acres of vacant, redevelopable and infill land were added together and then a percentage of this total was subtracted to account for public right of way needs. For this report, 25 percent of the buildable land supply was assumed to be needed for public right of way. In 2009 Vernonia had 189.9 acres of buildable land within the UGB.

TABLE 3
2009 Buildable Lands

Zone	Vacant	Redevelopable	Infill	Public Right of Way	Total Buildable
R	112.43	14.95	46.67	43.51	130.54
GR	8.69	1.94	4.59	3.81	11.42
LDR	24.43	0	0	6.11	18.32
LI	3.49	0	34.16	9.41	28.24
PR	0	0	0	0.00	0.00
GC	1.38	0.29	0	0.42	1.25
DT	0.15	0	0	0.04	0.11
TOTALS	**150.57**	**17.18**	**85.42**	**-63.29**	**189.9**

Source: Draft City of Vernonia Buildable Land Inventory (2009)

Current Employment

The draft City of Vernonia Economic Opportunity Analysis is being finalized concurrently with the Vernonia TSP update. This study includes existing employment information and serves as the basis of the information provided in this section.

The estimated employment for 2008 within the City by type of employment is shown in Table 4. Existing employment was estimated by using business licenses and information from the Vernonia Chamber of Commerce. These estimates were based on regular market conditions. Due to the recession, there has been a significant increase in unemployment which may reduce the amount of employment currently found within the City.

TABLE 4
City of Vernonia Current Employment

North American Industry Classification System	# of Firms	Employees 2008
Natural Resource	5	20
Construction	24	41
Manufacturing	12	22
Wholesale Trade	0	0
Retail Trade	43	100
Transportation, Warehouse and Utilities	8	40
Information	3	5
Financial Activities	8	21
Professional & Business Services	30	48
Education Services	1	85
Healthcare and Social Assistance	13	32
Leisure & Hospitality Services	15	65
Other Services	17	44
Public Administration	6	32
Total observed	**185**	**555**

Source: Draft City of Vernonia Economic Opportunity Analysis (2009)

Since Vernonia is a small study area, it is important to realize that any change in employment can affect the amount of jobs available to community members. Currently there are no plans for firms to settle in Vernonia, though the three largest employers, the School District, Government, and a Retreat and Conference Center are not expected to leave in the next 20 years.

Vernonia currently has three schools located on the same site, including Washington Grade School, Vernonia Middle School, and Vernonia High School. The Vernonia School District currently serves approximately 586 students, and employs an estimated 68 teachers and staff[2]. The school district may see a significant increase in enrollment and jobs if financing for the new school campus is found. Enrollment at the local school has decreased sine the 2007 flood. It is expected to rise significantly if a new school is built outside the floodplain.

[2] This excludes the students and employees at Mist Elementary School, which is within the Vernonia Schools District, but outside the Vernonia UGB. Source: http://www.vernonia.k12.or.us/

Existing Conditions Operational Analysis

Traffic Operations

This section describes the existing (2010) transportation conditions within the Vernonia Transportation System Plan (TSP) analysis study area. This section provides an overview of the traffic analysis and operational results, which are appended. This section updates the Roadway Operation section of the 1999 TSP.

Methodology

This section describes the data collected for the traffic analysis task and the methodology employed for the traffic operational analysis.

Study Intersections and Analysis Time Period

The existing conditions traffic analysis describes the motor vehicle operations for the existing (2010) p.m. peak hour conditions based on existing roadway geometry, lane configuration, and intersection control. This information provides the project team with an understanding of the mobility level and length of average vehicle delay on the existing roadway network within the City of Vernonia.

Ten study intersections were analyzed as part of the Vernonia TSP existing conditions analysis. The 1999 TSP analyzed different study area intersections than this TSP update. Table 5 shows the 1999 TSP intersections and the TSP update study area intersections. The difference between the two sets of intersections is based on the change in expected areas of development within the City of Vernonia and the focus of the TSP update, which includes relocating the Schools. Five of the study area intersections are the same, while five are different. The different intersections are highlighted in grey in the table below. No operational issues were found in the 1999 TSP study area intersections. Counts were provided by ODOT from previous study efforts conducted during the last 3 years. Table 6 identifies the count locations, intersection traffic control, count duration, and count date.

TABLE 5
1999 Vernonia TSP and TSP Update Study Area Intersections

1999 TSP intersections	TSP Update Intersections
Rose Avenue/Cougar Street	Rose Avenue/Cougar Street
Rose Avenue/Bridge Street	Rose Avenue/Bridge Street
Bridge Street/State Avenue	Bridge Street/State Avenue
Bridge Street/Texas Avenue	Bridge Street/Texas Avenue
Keasey Road/State Avenue/Stoney Point Road	Stoney Point Road/State Avenue
Bridge Street/ California	Bridge Street/Weed Avenue
Bridge Street/Jefferson Avenue	Bridge Street/Missouri Avenue
Bridge Street/Mist Drive	Bridge Street/Riverside Drive
Mist Drive/Knott Street	Maple Street/Rose Avenue
Stoney Point Road/Mellinger Road	Maple Street/Weed Avenue[1]

Sources: City of Vernonia TSP 1999
CH2M HILL 2010

TABLE 6

Vernonia Transportation System Plan – Traffic Study Intersections

ID #	Intersection	Traffic Control	Time of Count	Count Date
1	Stoney Point Road/State Avenue[1]	Two-Way Stop Controlled	4:00 PM to 6:00 PM	April 15th, 2008
2	Bridge Street/Rose Avenue	All-Way Stop Controlled[2]	3:00 PM to 5:00 PM	March 10th, 2010
3	Bridge Street/Weed Avenue	One-Way Stop Controlled	3:00 PM to 5:00 PM	March 10th, 2010
4	Bridge Street/State Avenue	One-Way Stop Controlled	4:00 PM to 6:00 PM	April 15th, 2008
5	Bridge Street/Texas Avenue	Two-Way Stop Controlled	2:30 PM to 6:00 PM	December 2nd, 2009
6	Bridge Street/Missouri Avenue	Two-Way Stop Controlled	3:00 PM to 6:00 PM	December 2nd, 2009
7	Bridge Street/Riverside Drive	Two-Way Stop Controlled	4:00 PM to 6:00 PM	April 24th, 2008
8	Maple Street/Rose Avenue	Two-Way Stop Controlled	3:00 PM to 5:00 PM	March 10th, 2010
9	Maple Street/Weed Avenue[1]	All-Way Stop Controlled	3:00 PM to 5:00 PM	March 10th, 2010
10	Cougar Street/Rose Avenue	Two-Way Stop Controlled	3:00 PM to 5:00 PM	March 10th, 2010

Notes:
[1]Intersection not under ODOT jurisdiction. Under jurisdiction of City of Vernonia.
[2]Westbound approach is yield controlled.

Peak hour turning movement volumes at each study intersection were identified from the p.m. peak period counts at each location. The peak hour is the single hour of the day that has the highest system hourly volume. Raw traffic count data is provided in Attachment A, Figure A.1, which shows that each intersection peaks during a different p.m. peak hour. Upon inspection of the counts, the p.m. peak hour occurs between 4:00 and 5:00 p.m. at the majority of intersections. Since the majority of study intersections share a common peak hour, and two previous studies - *West Oregon Electric Cooperative, Inc. Transportation Impact Analysis (DEA, May 2010*) and the *Nehalem View Subdivision Traffic Impact Study (Lancaster Engineering, May 2008)* – also identified 4:00 to 5:00 p.m. as the system peak hour, this system peak was selected for the Vernonia TSP traffic analysis. The system peak hour traffic volumes and intersection channelization are illustrated in Attachment A, Figure A.2.

Seasonal and Growth Adjustments

The traffic volumes collected at the intersections shown above were used to develop the 30th higher hour traffic volume (30 HV). The 30 HV volumes represent traffic that has been normalized to the same existing year (2010) and seasonally adjusted to the peak month of the year. Traffic volumes are converted to 30 HV because traffic counts were not collected during the month(s) when traffic volumes are typically at their highest levels. This approach provides a more conservative analysis and satisfies the requirements outlined by ODOT.

Traffic volumes were collected between 2008 and 2010. To adjust the 2008 and 2009 volumes to existing year (2010), an annual growth factor of 1.01 was applied to the applicable traffic counts. The 1.01 growth factor was derived from historic average daily traffic counts taken between OR 47 milepost 61.72 to 62.79 over the past 10 years.

After factoring the counts to 2010 volumes, the peak hour turning movement counts were adjusted to account for seasonal effects according to the ODOT Transportation Planning Analysis Unit (TPAU) *Analysis Procedures Manual (APM)*. The APM documents three different methods to calculate seasonal adjustment factors:

- On-Site Automatic Traffic Recorder (ATR) Method
- ATR Characteristic Table Method
- ATR Seasonal Trend Table Method

The on-site ATR method uses traffic trends measured at an ATR within the project site. There were no ATR stations located along OR 47 in the immediate study area. The closest ATR station, 34-005 is located along US 26. Upon inspection of the ATR seasonal trends, this site experiences a coastal destination route seasonal traffic trend, which is not representative of the agricultural and rural trends experienced through the study area. Therefore, the on-site ATR method was not selected to seasonally adjust the traffic counts.

Since an appropriate on-site ATR cannot be located, the ATR Characteristic Table Method was used to determine the seasonal adjustment factor. This method identifies an ATR with similar seasonal traffic characteristics as the project area. Using the data provided in the ODOT 2010 ATR Characteristic Table, ATR 03-013 was selected as the

most representative station for the Vernonia study area. The characteristics for this site are provided in Table 7.

TABLE7

Vernonia Transportation System Plan – ATR 03-013 Site Characteristics

Seasonal Traffic Trend	Area Type	# of Lanes	Weekly Traffic Trend	AADT	OHP Classification
AGRICULTURAL	RURAL	2	WEEKDAY	3900	DISTRICT HIGHWAY

Source: 2010 ATR Characteristics Table, ODOT
http://www.oregon.gov/ODOT/TD/TPAU/A_Data.shtml

This ATR site was selected since it has similar characteristics, such as the seasonal traffic trend and area type, compared with the project study area. Furthermore, the ATR site average annual daily traffic (AADT) is within 10 percent of the traffic volumes along OR 47, and has the same number of lanes as OR 47 through the study area.

Using data provided by ATR 03-013, seasonal adjustment factors are calculated for each count date and provided in Table 8. The yearly and seasonally adjusted traffic volumes for each study intersection are also shown in Attachment A, Figure A.3.

TABLE 8

Vernonia Transportation System Plan – Seasonal Trend Adjustment

Count Date	Seasonal Adjustment Factor
December 2	1.185
March 10	1.149
April 15	1.091
April 24	1.082

Note: Data for counts not occurring on the 15th of the month has been interpolated.
Source: 2005-2009 Permanent Automatic Traffic Recorder Stations – Trend Summaries. ODOT. http://www.oregon.gov/ODOT/TD/TDATA/tsm/tvt.shtml

Detailed calculations for these seasonal adjustment factors are provided in Attachment A of this memo.

The derived 30th highest hour design volumes were balanced between adjacent study intersections, as outlined by ODOT standards. Traffic volumes were not balanced along OR 47 between Weed Avenue and Texas Avenue, and between Missouri Avenue and Riverside drive due to the presence of other local roads and multiple driveways. Traffic volumes were also rounded to the nearest five vehicles. Traffic volumes less than 5 vehicles are indicated by a "<5" annotation. Attachment A, Figure A.4 illustrates the final rounded and balanced 30HV traffic volumes.

Performance and Mobility Standards

State highway mobility standards were developed for the *Oregon Highway Plan (OHP)* as a method to gauge reasonable and consistent standards for traffic flow along state highways. These mobility standards consider the classification (e.g., freeway, regional, district) and location (rural, urban) of each state highway. Mobility standards are based on volume to capacity (V/C) ratios. The 1999 OHP, with amendments adopted by the Oregon Transportation Commission from November 1999 through January 2006, was released on August 23, 2006. This version of the 1999 OHP will be referred to in this study.

Table 8 shows the OHP mobility standards for each study intersection. . These standards will be applied to all study intersections since they are all within ODOT jurisdiction. The intersection mobility standard is determined based on its traffic control. For unsignalized intersections, the highest V/C value for the major movement and the minor street movement is reported. Table 9 will be used to identify mobility standards in the existing and future conditions analysis.

Eight of the ten study intersections are located within ODOT Jurisdiction. The intersections of Maple Street/Weed Avenue and State Avenue/Stoney Point Road are under City of Vernonia jurisdiction. The 1999 Vernonia TSP assumed a mobility standard of LOS D, which will be applied to these two study intersections for existing and future scenarios.

TABLE 9
Vernonia Transportation System Plan – Intersection Classifications and Mobility Standards

No.	Location	Mile Point	OHP Highway Classification	Mobility Standard Category	Area	Speed (mph)	Existing or Future No-Build V/C Ratio Standard
				OR 47			
2	At Bridge Street	62.54	District	District	STA	20	0.95/0.95*
3	At Weed Avenue	62.48	District	District	STA	20	0.95/0.95
4	At State Avenue	62.09	District	District	Non-MPO	25	0.90/0.90
5	At Texas Avenue	61.70	District	District	Non-MPO	35	0.90/0.90
6	At Missouri Avenue	61.63	District	District	Non-MPO	35	0.90/0.90
7	At Riverside Drive	61.32	District	District	Non-MPO	35	0.90/0.90
8	At Maple Street	62.60	District	District	Non-MPO	25	0.90/0.90
10	At Cougar Street	62.66	District	District	Non-MPO	35	0.90/0.90

STA – Special Transportation Area
* V/C Ratio Standards are shown as uncontrolled approach/controlled approach
Speed Source: Field Visit (2010)
Existing and No-Build Mobility Source: Adopted Oregon Highway Plan as Amended in August 2006 (Table 6)

Traffic Analysis Software Tools

A Synchro 7 computer traffic operations model was constructed for the study area based on field observations of lane geometry and intersection control. The balanced 30th highest hour design turning movement volumes were applied, along with peak hour factors and truck percentages from the gathered turning movement counts. This model was used to assess existing traffic operations within the study area.

The Synchro model uses methodologies in the *2000 Highway Capacity Manual (HCM)* to analyze both signalized and stop-controlled intersections. The model also computes the v/c ratio and LOS to determine whether the intersection meets the applicable mobility standards.

SimTraffic, a traffic microsimulation software program, was used to collect vehicle queuing information for all signalized intersections. As a microscopic traffic model, SimTraffic models each vehicle as a separate entity with its own individual parameters and car-following logic.

Vehicle queue results are reported for the expected 95th percentile queue length, which means that 95 percent of the time during the peak hour analyzed, the queue length should be less than or equal to the value reported. An average of five SimTraffic runs was used to calculate the 95th percentile queue lengths.

Intersection Operational & Vehicle Queuing Analysis

Average intersection vehicle delay and level-of-service, 95th percentile queue length, and volume to capacity ratios were collected from the existing conditions Synchro and SimTraffic simulation models for the study area intersections. All Synchro and SimTraffic modeling followed the procedures outlined in the APM

Operational Analysis Results

Results from the operational analysis indicate that all ten study intersections currently meet jurisdictional mobility standards. This section updates the Current Intersection Level of Service section of the 1999 TSP.

Table 6 shows the results of the existing conditions intersection operational analysis. Attachment A, Figure A.4 provides the volumes, channelization, and analysis results for all of the study area intersections. Attachment A also provides the Synchro HCM reports for each study intersection.

V/C ratios that exceed mobility standards indicate that the intersection experiences congestion and operates poorly on at least one approach during the peak period. Intersection V/C ratios lower than the mobility standards indicate that intersections are likely operating at acceptable levels of mobility.

As shown in Table 10, all of the 10 study intersections meet the OHP or City of Vernonia mobility standards during the p.m. peak hour. All study intersections operate with a v/c ratio less than 0.25, indicating very good operating conditions.

TABLE 10

Vernonia Transportation System Plan – Intersection Operational Results

ID	Intersection	Control Type	Mobility Standard		Existing Conditions (2010) Operations	
			Uncontrolled Approach	Controlled Approach	Uncontrolled Approach	Controlled Approach
1	State Avenue/Stoney Point Road	TWSC	LOS D		LOS A (9.7 sec/veh) Worst Movement= EBL/T/R	
2	Rose Avenue/Bridge Street[1]	AWSC	0.95		0.25	
3	Bridge Street/Weed Avenue	TWSC	0.95	0.95	0.02	0.16
4	Bridge Street/State Avenue	TWSC	0.90	0.90	0.15	0.14
5	Bridge Street/Texas Avenue	TWSC	0.90	0.90	0.02	0.05
6	Bridge Street/Missouri Avenue	TWSC	0.90	0.90	0.00	0.03
7	Bridge Street/Riverside Drive	TWSC	0.90	0.90	0.01	0.02
8	Rose Avenue/Maple Street	TWSC	0.90	0.90	0.00	0.08
9	Maple Street/Weed Avenue	AWSC	LOS D		LOS A (7.5 sec/veh)	
10	Rose Avenue/Cougar Street	TWSC	0.90	0.90	0.00	0.05

Notes:
[1]The intersection of Bridge Street/Rose Avenue has a free NBR movement. The westbound approach is yield controlled.
AWSC: All-Way Stop Controlled
TWSC: Two-Way Stop Controlled
V/C ratios for All-Way Stop Controlled intersections are for the whole intersection.
Source: Synchro 7 Operational Analysis

Vehicle Queuing Analysis Results

The analysis shows that no intersection lane groups within the study area are experiencing vehicle queue lengths that exceed existing available storage. Vehicle queues and available storage are shown in Table 11.

TABLE 11

Vernonia TSP - 2010 Existing Conditions 95th Percentile Queues

ID	Intersection	Method	Approach	Lane Group	Existing Storage (feet)	Queue Length (feet)
1	State Avenue/ Stoney Point Road	95% Queue SimTraffic	Eastbound	Left/Thru/Right	-	20[1]
			Westbound	Left/Thru/Right	740	40
2	Rose Avenue/ Bridge Street	95% Queue SimTraffic	Eastbound	Left/Thru/Right	280	50
			Westbound	Left/Thru/Right	260	40
			Northbound	Left/Thru	280	60
				Right	75	50
			Southbound	Left/Thru/Right	300	60
3	Bridge Street/ Weed Avenue	95% Queue SimTraffic	Southbound	Left/Thru/Right	-	70
4	Bridge Street/ State Avenue	95% Queue SimTraffic	Southbound	Left/ Right	240	70
5	Bridge Street/ Texas Avenue	95% Queue SimTraffic	Northbound	Left/Thru/Right	Driveway	n/a
			Southbound	Left/Thru/Right	150	50
6	Bridge Street/ Missouri Avenue	95% Queue SimTraffic	Northbound	Left/Thru/Right	850	30
			Southbound	Left/Thru/Right	120	20
7	Bridge Street/ Riverside Drive	95% Queue SimTraffic	Northbound	Left/Thru/Right	170	n/a
			Southbound	Left/Thru/Right	170	20
8	Rose Avenue/ Maple Street	95% Queue SimTraffic	Eastbound	Left/Thru/Right	260	20
			Westbound	Left/Thru/Right	290	60
9	Maple Street/ Weed Avenue	95% Queue SimTraffic	Eastbound	Thru/Right	290	60
			Westbound	Left/Thru	290	50
			Northbound	Left/ Right	270	30
			Southbound	Left/Thru/Right	280	60
10	Rose Avenue/ Cougar Street	95% Queue SimTraffic	Eastbound	Left/Thru/Right	270	50
			Westbound	Left/Thru/Right	driveway	20[1]

Notes:

[1] Queue Lengths less than 20' were rounded up to 20' to represent the minimum queue length of a single vehicle.

95th Percentile queues calculated using an average of five, one hour SimTraffic runs

Queue lengths not reported for free-flowing and uncontrolled movements

Queue lengths rounded up to the nearest ten feet

Movements in black highlight indicate a vehicle queue length that exceeds the available storage length

- indicates existing storage exceeds 1,000 feet.

Distances provided are available storage lengths from stop bar to the beginning of the taper or to nearest adjacent intersection.

Queue lengths are rounded up to the nearest 10 feet.

n/a= not applicable. No vehicle turn movements were recorded during the p.m. peak hour.

Safety Analysis

This section updates the Traffic Safety Section of the 1999 TSP.

A detailed traffic safety analysis was not conducted for the Vernonia Transportation System Plan Update. Based on OR 47 crash records between milepost 61 through 63, 46 recorded crashes occurred between 2000 and 2009. These crashes were fairly uniform in distribution. The highest number of crashes were fixed object. Other crashes types included rear end, pedestrian, and animal type crashes. Angle (turning) and crossing type crashes did occur; however, they were infrequent. Due to the relatively low number of recorded collisions over the last 10 years (4.6 collisions per year), ODOT and the project team concluded a focused crash analysis would not be of significant value to update.

Summary of Existing Conditions

Operational Conditions

All study intersections meet applicable mobility standards and all intersection lane groups have 95th percentile queue lengths that are at or less than storage capacity.

Access Points along OR 47

This section updates the State Highway Access Conditions section of the 1999 TSP.

An inventory of all public and private access points within the study area was conducted, and the access points are aggregated by OR 47 road segment in Table 12 and Figure 4 a,b. Within the study area, there are a total of 112 access points along the facility. Forty access points are associated with intersection approaches while the remaining 82 access points are residential or business driveways. Many residential driveways access OR 47 directly.

TABLE 12

City of Vernonia TSP – OR 47 Existing Access Inventory

	Number of Access Points to Highway	
OR 47 Road Segment	South and East Side	North and West Side
Rose Street from Limits to Bridge	4	10
Bridge Street from Rose Avenue to Rock Creek	7	13
Bridge Street from Rock Creek to Texas Avenue	7	13
Bridge Street from Texas Avenue to Mist Drive	9	11
N Mist Drive from Bridge Street to Ivy Street	13	0
N Mist Drive from Ivy Street to City Limits	8	17
Total Access Points	48	64

CH2M HILL analysis, 2010

The State of Oregon had codified access management and spacing standards. The purpose of these standards is to provide a safe and efficient transportation system by protecting highway traffic from the hazards of unrestricted and unregulated entry from adjacent properties. Oregon Administrative Rule (OAR) 734-051-0115 specifies access management standards for ODOT facilities. The standards are based on the functional classification of the highway, the general type of land use (i.e., rural, urban), and the posted speed. In the Vernonia study area, OR 47 is subject to state access spacing standards. Relevant state access management spacing standards for OR 47 are found in Table 4 of the OAR Division 51 Tables. This Division 51 table is provided here as Table 13, with applicable spacing standard values bolded in each table.

TABLE 13
Division 51 Tables, Table 4:ODOT Access Management Spacing Standards for Private and Public Approaches on District Highways (1)(2)(3)(4)
*Measurement is in Feet**

Posted Speed(5) **(miles per hour)**	**Rural Expressway ****	**Rural**	**Urban Expressway** *****	**Urban *****	**STA******
≥55	5,280	700	2,640	700	
50	5,280	550	2,640	550	
40 & 45	5,280	500	2,640	500	
30 & 35		400		350	(6)
≤25		400		350	(6)

Notes:

**Measurement of the approach road spacing is from center to center on the same side of the roadway*

*** Spacing for Expressway at-grade intersections only. See the OHP for interchange spacing guidelines.*

****These standards also apply to Commercial Centers.*

*****Special Transportation Area*
Source: http://www.oregon.gov/ODOT/HWY/ACCESSMGT/accessmanagementmanual.shtml

(1) These access management spacing standards are for unsignalized approaches only. Signal spacing standards supersede access management spacing standards for approaches.

(2) These access management spacing standards do not apply to approaches in existence prior to April 1, 2000 except as provided in OAR 734-051-0115(1)(c) and 734-051-0125(1)(c).

(3) For infill and redevelopment, see OAR 734-051-0135(4).

(4) For deviations to the designated access management spacing standards see OAR 734-051-0135.

(5) Posted (or Desirable) Speed: Posted speed can only be adjusted (up or down) after a speed study is conducted and that study determines the correct posted speed to be different than the current posted speed. In cases where actual speeds are suspected to be much higher than posted speeds, the Department reserves the right to adjust the access management spacing accordingly. A determination can be made to go to longer access management spacing standards as appropriate for a higher speed. A speed study will need to be conducted to determine the correct speed.

(6) Minimum access management spacing for public road approaches is the existing city block spacing or the city block spacing as identified in the local comprehensive plan. Public road connections are preferred over private driveways and in STAs driveways are discouraged. However, where driveways are allowed and

where land use patterns permit, the minimum access management spacing for driveways is 175 feet (55 meters) or mid-block if the current city block spacing is less than 350 feet (110 meters).

Of the 40 public approaches onto OR 47 in the Vernonia Study area, only three intersections meet ODOT intersection spacing requirements outlined in Table 13. The spacing between public intersections widely varies. Most intersections in the downtown area are spaced between 300 and 390 feet apart; however, none of these intersections maintain the required 350 feet between both upstream and downstream intersections. Furthermore, seven of the eighty-two private driveway approaches meet the standard. Only driveways located along N. Mist Drive near the Vernonia north city limits are within standard. These driveways are isolated from public approaches and therefore meet the applicable access standard.

Transit Facilities

This section updates the Public Transportation Services section of the 1999 TSP. The Columbia County Rider (CC Rider) provides the Nehalem Valley Fixed Route Service each Monday through Friday to serve commuters of Vernonia. The morning route originates from Vernonia City Hall, departing at 6:15 a.m., with stops at Stub Stewart State Park and Staley's Junction before arriving at Tri-Met's Willow Creek Station at 7:15 a.m. for transfers to Tri-Met's system. The morning return trip arrives back at City Hall at 8:10 a.m. The afternoon trip makes the same stops and departs City Hall a 4:30 p.m., arrives at the Willow Creek Station at 5:30 p.m., and is back at City Hall at 6:25 p.m. In addition, Vernonia is served by the CC Rider West County Flex Route, which operates between Vernonia and St. Helens with stops in Scappoose. This route currently operates on Tuesdays and Thursdays only, with departure times from Vernonia at 8:30 and 11:00 am, and 2:00 pm. This bus connects with the CC Rider Portland and Washington County Fixed Route buses as well as the North and South Flex Routes.

Bicycle and Pedestrian Facilities

According to the American Association of State Highway and Transportation Officials (AASHTO)'s Guide for the Development of Bicycle Facilities and the Oregon Bicycle and Pedestrian Plan (OBPP), there are several different types of bicycle facilities. Bikeways are distinguished as preferential roadways that have facilities to accommodate bicycles. Accommodation can be a bicycle route designation or bicycle lane striping. Shared-use paths are facilities separated from a roadway for use by cyclists, pedestrians, skaters, runners, and others. Bicycles are allowed on all study area roadways.

The following types of bikeways are recognized by AASHTO and OBPP:

Shared Roadway / Signed Shared Roadway – Shared roadways include roadways on which bicyclists and motorists share the same travel lane. This is the most common type of bikeway. The most suitable roadways for shared bicycle use are those with low speeds (25 mph or less) or low traffic volumes (3,000 vehicles per day or fewer). Signed shared roadways are shared roadways that are designated and signed as bicycle routes and serve to provide continuity to other bicycle facilities (i.e., bicycle lanes) or designate a preferred route through the community. Common practice is to sign the route with standard Manual on Uniform Traffic Control Devices (MUTCD)

green bicycle route signs with directional arrows. The OBPP recommends against the use of bike route signs if they do not have directional arrows and/or information accompanying them. Signed shared roadways can also be signed with innovative signing that highlights a special touring route or provides directional information in bicycling minutes or distance.

- *Shoulder Bikeway* – These are paved roadways that have striped shoulders wide enough for bicycle travel. ODOT recommends a 6-foot paved shoulder to adequately provide for bicyclists, and a 4-foot minimum in constrained areas. Roadways with shoulders less than 4-feet are considered shared roadways. Sometimes shoulder bikeways are signed to alert motorists to expect bicycle travel along the roadway.
- *Bike Lane* - Bike lanes are portions of the roadway designated specifically for bicycle travel via a striped lane and pavement stencils. ODOT standard width for a bicycle lane is 6 feet. The minimum width of a bicycle lane against a curb or adjacent to a parking lane is 5 feet. A bicycle lane may be as narrow as 4 feet, but only in very constrained situations. Bike lanes are most appropriate on arterials and major collectors, where high traffic volumes and speeds warrant greater separation.
- *Shared-Use Path* – Shared-use paths are used by a variety of non-motorized users, including pedestrians, cyclists, skaters, and runners. Shared-use paths may be paved or unpaved, and are often wider than an average sidewalk (i.e. 10 – 14 feet). In rare circumstances where peak traffic is expected to be low, pedestrian traffic is not expected to be more than occasional, good passing opportunities can be provided, and when maintenance vehicle loads are not expected to damage pavement, the width may be reduced to as little as 8 feet.

Existing Facilities

The following paragraphs describe the bicycle facilities present in Vernonia. See Figure 5 for an inventory of bicycle facilities on arterial and collector streets. Guidance for the construction of new bicycle facilities in the City of Vernonia is included in Public Works Design Standards Section 6.0070, with minimum widths for different facility types provided in Section 6.0071.

Bike Lanes / Shoulder Bikeways

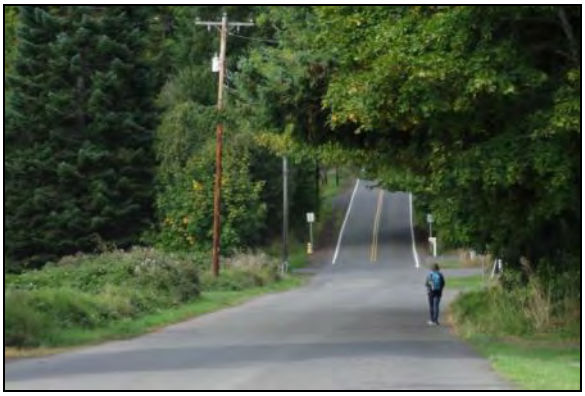
This section updates the Bicycle Facilities section of the 1999 TSP. Oregon Highway 47 is marked with a bike lane for approximately one third of a mile inside the Vernonia city limits, from Vernonia Lake City Park on the east to Texas Avenue on the west. The highway lacks bike lanes or shoulders through central Vernonia between O-A Hill and Rose Street, due to topographic constraints around O-A Hill and on-street parking provided through

Highway 47 bike lane with bike stencil.

downtown. The Rock Creek and Nehalem River bridges are constrained areas for bicyclists riding on Highway 47, where the roadway narrows to approximately 22-24 feet, where cyclists and motorists share 11-12 foot lanes in each direction. The Oregon State Bicycle Map shows Highway 47 as having wide 4-foot shoulders as it travels on Rose Avenue south of Bridge Street and on Mist Drive from the Nehalem River Bridge to Knott Street.

Shared Roadways / Signed Shared Roadways

Most local streets in Vernonia are low speed/low volume roadways that could be classified as shared roadways. These streets can accommodate bicyclists of varying 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). Roadway widths range between 25 and 40 feet with typical street cross-sections including two vehicle travel lanes with parking on both sides, depending on the presence of curbs and sidewalks.



State Avenue is an example of a shared roadway in Vernonia.

State Avenue is the only street in Vernonia designated as an urban collector/major rural collector other than Highway 47. A posted speed of 25 mph and a curb-to-curb width of 36 feet provide ample room for the street to function as a shared roadway south of C Street. North of C Street, State Avenue narrows, with a variable width shoulder of zero to two feet. The posted speed increases to 35 mph and there is no bikeway signing or other accommodations for bicyclists.

Shared-use Paths

There are several shared-use paths in Vernonia, all of which are located south of Bridge Street and Highway 47. The Banks-Vernonia State Trail parallels Highway 47, connecting Vernonia to the town of Banks and the recently opened Stub Stewart State Park to the south. The State Trail is paved with asphalt and measures approximately eight feet wide, below the recommended minimum width for shared-use paths. Just under two miles long, the Vernonia Linear Trail Extension connects the Banks-

The Vernonia Linear Trail Extension is a two-mile long multi-use path that loops around Vernonia Lake.

Vernonia State Trail to Vernonia Lake City Park and completes a loop around Vernonia Lake. The Linear Extension also measures approximately eight feet wide, with two foot wide gravel shoulders on either side. Another 0.2 miles of shared-use path connects the Banks-Vernonia State Trail to California Avenue long the southern edge of the existing Vernonia school fields. Access to these paths from east of the Nehalem River is difficult, given lack of bicycle facilities on the Nehalem River bridge on Highway 47.

Pedestrian Facilities

This section updates the Pedestrian Facilities section of the 1999 TSP. According to the OBPP, pedestrian facilities are defined as any facilities utilized by a pedestrian or persons in wheelchairs. These types of facilities include walkways, traffic signals, crosswalks, curb ramps, and other features such as illumination or benches.

The following types of pedestrian facilities are recognized by AASHTO and the OBPP:

- *Sidewalks* – Sidewalks are located along roadways, are separated from the roadway with a curb and/or planting strip, and have a hard, smooth surface, such as concrete. The ODOT standard for sidewalk travelway width is 6 feet, with a minimum travelway width of 5 feet acceptable on local streets. The unobstructed travelway for pedestrians should be clear of utility poles, sign posts, fire hydrants, vegetation and other site furnishings. Sidewalks located directly adjacent to the curb are known as "attached" sidewalks, while sidewalks buffered from the curb by a planter strip are known as "detached" sidewalks.
- *Shared-use Paths* – Shared-use paths are used by a variety of non-motorized users, including pedestrians, cyclists, skaters, and runners. Shared-use paths may be paved or unpaved, and are often wider than an average sidewalk (i.e. 10 – 14 feet). In rare circumstances where peak traffic is expected to be low, pedestrian traffic is not expected to be more than occasional, good passing opportunities can be provided, AND maintenance vehicle loads are not expected to damage pavement, the width may be reduced to as little as 8 feet.
- *Roadway Shoulders* – Roadway shoulders often serve as pedestrian routes in many rural Oregon communities. On roadways with low traffic volumes (i.e., less than 3,000 vehicles per day), roadway shoulders are often adequate for pedestrian travel. These roadways should have shoulders wide enough so that both pedestrians and bicyclists can use them, usually 6 feet or greater.

Existing Pedestrian Facilities

The following paragraphs describe the pedestrian facilities present in Vernonia. See Figure 6 for an inventory of pedestrian facilities on arterial and collector streets.

Sidewalks

The presence and condition of sidewalks in Vernonia varies by location. Where they exist, older sidewalks are generally four feet wide, set back from the curb by a planter strip, and may show some condition issues including cracks or heaves. Newer sidewalks are five feet wide, set curb-tight and in good condition, though some segments of newer sidewalks are located in areas without a consistent sidewalk

network. Sidewalk widths throughout the city measure from four feet in areas with older sidewalks, to ten feet downtown and along the south side of Bridge Street adjacent to the existing Vernonia schools. Design requirements for the construction of sidewalks in the City of Vernonia are set forth in Public Works Design Standards Section 6.0060. The minimum width for the construction of new sidewalks is 5 feet or greater, depending on street classification and adjacent land use.

Northwest Vernonia

North of Bridge Street and west of Rose Avenue, most streets lack sidewalks. Exceptions are in areas of recent development, where curb-tight sidewalks were installed along with the construction of new housing. Examples of these areas include 4th Avenue and Rose Hedge Court.

Bridge Street in downtown Vernonia has pedestrian amenities – such as curb extensions, street trees, pedestrian-scale lighting and decorative stamped crosswalks – that help improve the pedestrian experience.

Downtown Vernonia and Bridge Street

The sidewalk environment in the downtown core includes a variety of complementary pedestrian facilities such as ADA-compliant curb ramps at intersections, sidewalk curb extensions, pedestrian-scale lighting, and street trees. Sidewalks on Bridge Street downtown are ten feet wide, with a six foot clear zone and four foot planter strip/furniture zone. Planter strips downtown contain street trees but are otherwise filled with concrete paving stones. Most intersections at Bridge Street downtown are equipped with small curb extensions with curb ramps and decorative stamped crosswalks. These amenities, along with improved building frontages, make for an inviting pedestrian environment in downtown Vernonia.

Most north-south side streets in the downtown area also have sidewalks set back from the curb by planter strips. Notable streets in the downtown area missing sidewalks include Maple Street, Cougar Street and Weed Avenue. Sidewalks on Bridge Street taper to five feet wide, curb-tight, over the Rock Creek Bridge. The lack of sidewalks on Weed Avenue north of Bridge Street is highlighted by the presence of an informal demand path between the dead-end of Columbia Street and the Wauna Federal Credit Union parking lot.

Rock Creek to O-A Hill

The majority of existing sidewalks in Vernonia are located in the residential area between Rock Creek and O-A Hill, north of Bridge Street and the existing Vernonia schools. Most sidewalks in this area are four feet wide and set back from the curb by a planter strip. However, sidewalks lack curb ramps at most intersections in this area. In some places, the sidewalk is set lower than the roadway and existing curbs, and the curb

becomes an obstacle and trip-hazard to pedestrian traffic. Intersections along Bridge Street are generally exceptions to this trend, with stamped crosswalks and curb ramps at locations that access the existing Vernonia Schools. The sidewalk on the south side of Bridge Street directly adjacent to the schools is ten feet wide and curb-tight.

O-A Hill

O-A Hill is the main obstacle to east-west pedestrian movement across Vernonia; Bridge Street/Highway 47 is the only through street pedestrians can use to traverse the hill. As it wraps around O-A Hill, Bridge Street lacks sidewalks or shoulders on either side, but pedestrians may use a sidepath on the south side of the street, separated from motor vehicle traffic by a guard rail. Like the adjacent roadway, the sidepath is paved with asphalt. There are no major issues with the pavement condition on the sidepath. The clear travelway along the sidepath is six feet between the guard rail footings on the north side and a chain link fence on the south side, which is below the standard for a path facility that is shared by both pedestrians and bicyclists. Pedestrians and bicyclists may have difficulty crossing to the south side of Bridge Street in order to use the sidepath due to limited visibility on either side as the street curves around O-A Hill.

A six foot wide sidepath along the south side of Bridge Street is the only formal facility for bicyclists and pedestrians who need to cross O-A Hill.

The many informal paths between the alphabet streets on the west and Louisiana Avenue on the east side of O-A Hill reflect the need to cross the hill for Vernonia residents. These paths are steep, with slopes of up to 40%in order to gain the elevation of over 100 feet to summit the hill. Many of these informal paths begin at the bottom of the hill at the ends of streets such as North Street and A Street, and emerge at the top of the hill on Louisiana Avenue or in the bushes of Ora Bolmeier City Park.

O-A Hill to Nehalem River

With the exception of Bridge Street, and several houses recently constructed on Lakeview Drive, there are virtually no sidewalks on streets between O-A Hill and the Nehalem River. Sidewalks along Bridge Street in this area are generally curb-tight and five feet wide, with curb ramps at most intersections. Sidewalks along Bridge Street end near Spencer Avenue and Vernonia Lake City Park. Pedestrians use the shoulder on the south side of Bridge Street to cover the remaining distance east to the Nehalem River Bridge.

East of Nehalem River

There are five foot sidewalks on the Nehalem River Bridge, but the clear travelway is constrained at either end of the bridge to widths as little as three feet or less. Several local streets east of the Nehalem River such as Heather Lane have sidewalks, but Mist Drive/Highway 47 lacks dedicated pedestrian facilities. Pedestrians walking along Mist Drive use the highway shoulder, which varies up to four feet in width.

Shared-use Paths

Vernonia's shared-use paths, –discussed in the bicycle facilities section above, are attractive to residents and visitors as recreational and exercise facilities for walking and running. But whereas the majority Vernonia residents live on the north side of Bridge Street/Highway 47, all of Vernonia's existing shared-use paths are located on the south side of Bridge Street/Highway 47. Because they do not provide direct connections between common pedestrian trip origins and destinations in Vernonia, these shared-use paths serve only a limited function as pedestrian transportation routes.

Safe Routes to School

Walking and bicycling are key aspects of student travel to school in Vernonia. According to the Vernonia School Siting Travel Mode Study completed by Kittleson and Associates in 2008, walking is the most common mode of travel to school for students living inside the Vernonia city limit. Approximately 46 percent of students walk to school on a given day. Rates for student bicycling are lower, approximately 3 percent, but may reach levels as high as 10 percent during fair weather months at the beginning and end of the school year.

Existing conditions along Missouri Avenue near the future site of Vernonia schools. The 2009 Vernonia School Campus Transportation Impact Analysis Current plans call for the construction of a shared-use path parallel to the road

The sidewalk network adjacent to the existing Vernonia schools is among the most complete in the city. However, when the new Vernonia schools are built at the Boot Site at the existing Spencer Park, the schools will be located in an area that generally lacks sidewalks. The two streets that will provide access to the school, Texas Avenue and Missouri Avenue, currently lack sidewalks. The Vernonia School Campus Transportation Impact Analysis prepared by Kittleson and Associates in 2009 calls to "provide pedestrian and bike facilities" along Missouri Avenue (, and a "pedestrian-bike connection linking the campus to Texas Avenue."

The new schools' location east of O-A Hill will create a challenge for students living west of O-A Hill. According to the Vernonia School Siting Travel Mode Study completed by Kittleson and Associates in 2008, nearly 70% of students inside the Vernonia city limits live west of O-A Hill, and represent more than 74% of students currently walking to school. The only existing route to access the new school site from west of O-A Hill uses the six foot wide sidepath along the south side of Bridge Street. In light of conditions along the existing route on Bridge Street, the Transportation Impact Analysis recommends the following improvements:

- Retain bike lanes on Bridge Street between Texas and Missouri Avenues;

- Install a multi-use pedestrian-bicycle path along the south side of Bridge Street between Texas and Missouri Avenues;
- Provide a pedestrian connection from the new school site to the city center of Vernonia.

The Transportation Impact Analysis does not directly address the condition of the existing sidepath along Bridge Street around O-A Hill. However, it did develop two additional Proposed Alternative Routes intended to be analyzed further in the Vernonia TSP. These proposed routes would climb O-A Hill from North Street to Ora Bolmeier City Park, and follow local streets north of Bridge Street to connect to the new school site. These routes are currently used informally by local residents, but would be challenging to develop into formal pedestrian and bicycle facilities. Both alternative routes pass through a heavily forested area and face an elevation gain of approximately 100 feet over a short horizontal distance.

Bicycle and Pedestrian Volumes

Census 2000 Journey to Work data shows that approximately 3 percent of employed residents in Vernonia walk to work, while bicycling rates are too low to measure as a commute mode. Additionally, another 3 percent of Vernonia residents work from home, and may be likely to make local walking or bicycling trips during the day. Walking and bicycling are not feasible commute options for the majority of Vernonia workers who work outside the city, 77 percent as of Census 2000, due to distance.

A series of traffic counts conducted at key intersections in March 2010 correlates with moderate levels of walking traffic and low levels of bicycle traffic in Vernonia. The highest levels of pedestrian activity were measured in downtown, where 97 pedestrians, along with two bicyclists, were counted passing through the intersection of Bridge Street and Weed Avenue during the evening peak travel hours from 3 to 5 p.m.

Issues Important to the Community

The Transportation System Plan update is the first City document to be updated. The City hopes to continue updating various planning documents including the City's Comprehensive Plan to make sure they are up to date and consistent with State, County and other documents within the City.

At the first joint Project Advisory Committee (PAC) and Project Management Team (PMT) meeting, community leaders and stakeholders identified specific issues that might not be captured by the traffic analysis and inventory of existing facilities.

A number of PAC and PMT members noted that sight distance along Bridge Street from the side streets was hampered by on street parking, making it difficult to pull out onto Bridge Street safely. Other safety concerns or areas where "near misses" occur include the three leg intersection near Green Bride where Pebble Creek, Mist Drive and Bridge Street intersect, sight distance issues near Stoney Point and Keasey Roads near Mellinger. Pulling out from Hawkins Park onto Bridge Street is also dangerous due to limited sight distances. The group noted that the Rose Avenue/Bridge Street

intersection is confusing for visitors who are trying to follow OR 47 through town, and dangerous for pedestrians and bicyclists.

There were concerns about congestion on City streets from new development including the Nehalem View subdivision and the location of the new schools, potential development near the airport, and potential residential development near Rose and 6th Avenue. The Fire Department is concerned that queuing vehicles waiting to turn left onto Missouri to access the future school site may interfere with or lengthen response times for emergency vehicles exiting the fire station to respond to emergency calls.

PAC and PMT members also raised concerns about bicyclists and pedestrians in the City, specifically how students will get to the new school site by bicycle and walking, and were concerned with the sidewalk ending on the west side of Green bridge to and along Mist Drive. There was a concern about the safety of bicyclists on Bridge Street, and some members noted that bicyclists sometimes ride erratically on OR 47 through town.

The group discussed the need for bus pull-outs to allow vehicles to move out of the traffic flow to pick up riders, and the need for a park and ride in town, potentially at the site of the old Western Oregon Electric Co-Op building.

Summary

Land Use Inventory

- Most land in Vernonia is zoned residential
- There are some Buildable lands still available for development, mostly in residentially zoned areas, with some zoned light industrial
- There were approximately 560 jobs in Vernonia in 2008, and the main employers are the school district, government, and a retreat and conference center

Traffic Operations

- All 10 study area intersections operate within State and City standards
- There are currently no vehicle queues that exceed available storage capacity

Bicycle and Pedestrian Facilities

- There is a bike lane for approximately one third of a mile along OR 47 within the City Limits. The highway lacks shoulders through central Vernonia between O-A Hill and Rose Street due to topographical constraints and on-street parking
- Cyclists share the travel lane over Rock Creek and Nehalem River Bridges
- Most local streets could be considered shared roadways due to their low speeds and low traffic volumes
- There are some newly developed areas with sidewalks, though these are not always continuous

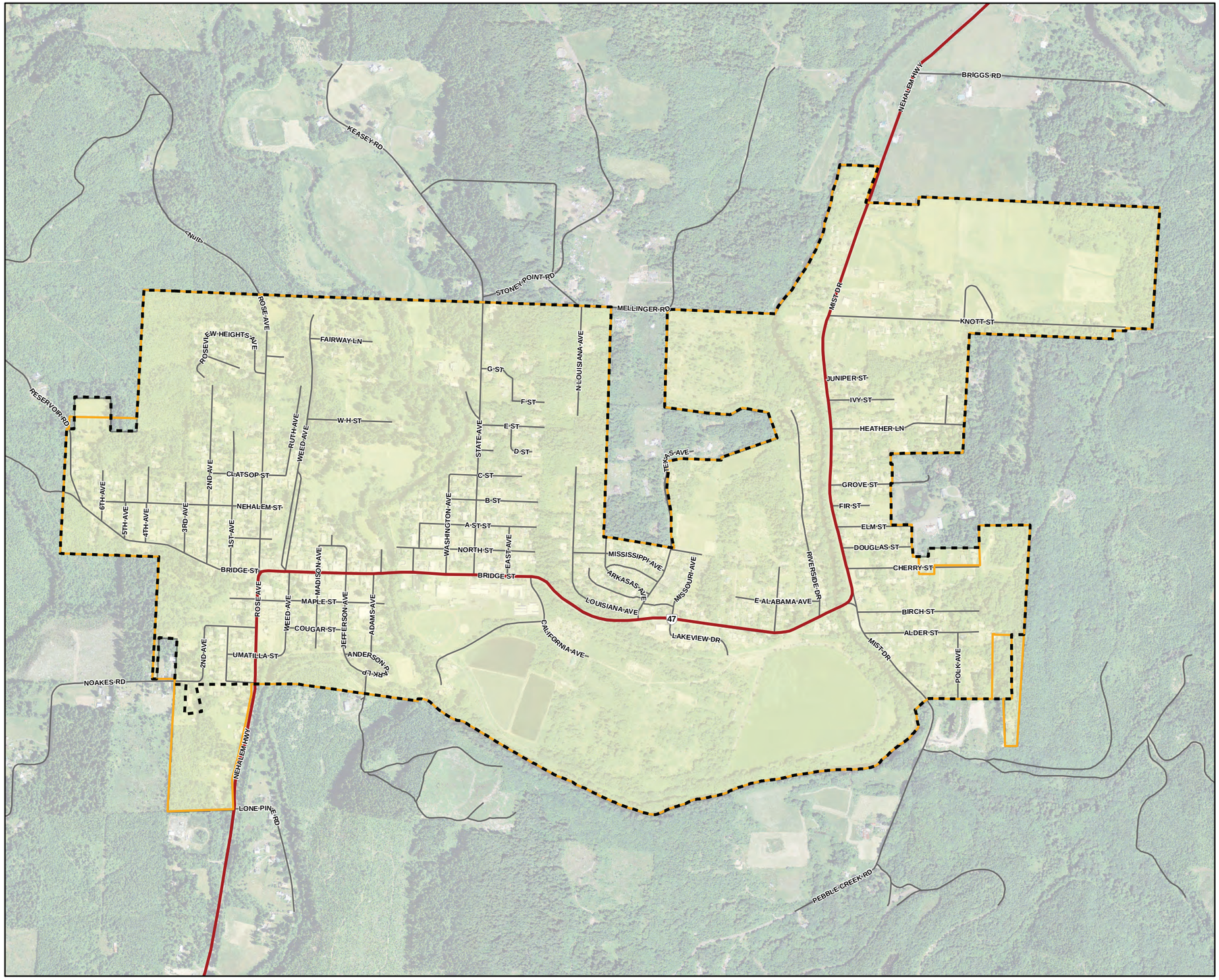
- Downtown and adjacent streets have a connected network of sidewalks with pedestrian amenities
- Maple Street, Cougar Street and Weed Avenue are lacking sidewalks near the downtown area
- O-A Hill is the main obstacle to east-west pedestrian movement within Vernonia – a sidepath along the south side of OR 47 is the only option for pedestrians
- There are very few sidewalks between O-A Hill and the Nehalem River
- Mist drive north of Bridge Street does not have any dedicated pedestrian facilities

NOTICE:

This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed, in part, by Federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), local government, and the State of Oregon funds.

The contents of this document do not necessarily reflect views or policies of the State of Oregon.

Figures



VICINITY MAP

LEGEND

- State Highway
- Streets
- City Limits
- Urban Growth Boundary
- Study Area

N

0 250 500 1,000
Feet

FIGURE 1
Study Area
Vernonia Transportation System Plan
City of Vernonia, Oregon

\\ROSA\PROJ\ODOT\410377VERNON\GIS\MAPFILES\FIGURE_1_STUDYAREA.MXD EDIURBA 10/22/2010 10:19:17

VICINITY MAP

LEGEND

- Study Area
- Streets
- State Highway

Zoning - BW

ZONING

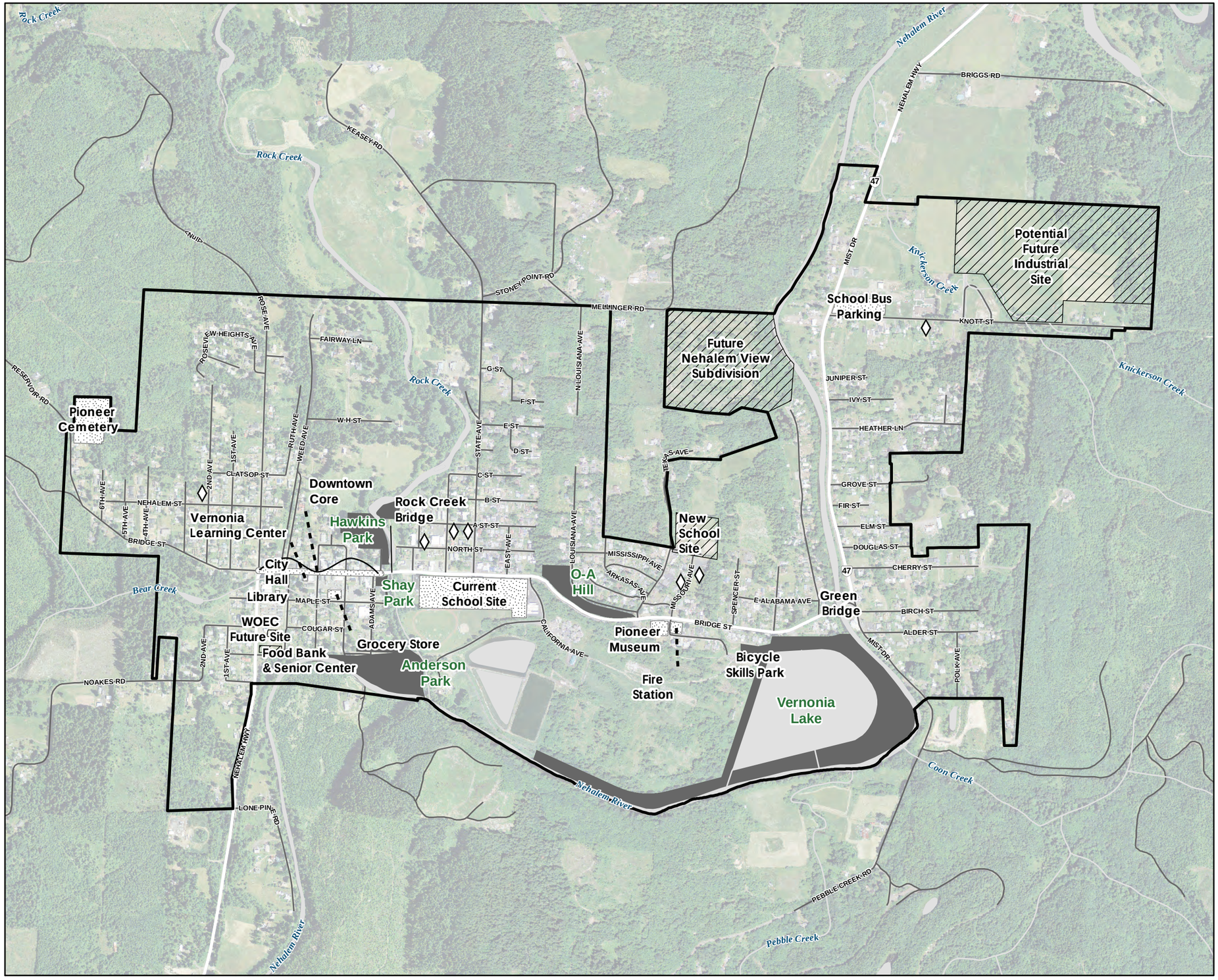
- DT - Downtown
- GC - General Commercial
- GR - General Residential
- IP - Institutional Public
- LDR - Low Density Residential
- LI - Light Industrial
- PR - Public Recreation
- R - Residential

Sources:
1. UGB and City Limits - City of Vernonia, 2010
2. Parcels and Streets - City of Vernonia, 2010

N

0 250 500 1,000
Feet

FIGURE 2
Zoning
Vernonia Transportation System Plan
City of Vernonia, Oregon



VICINITY MAP

LEGEND

- Churches
- State Highway
- Streets
- Study Area
- Parks
- Water Bodies

Community Facilities

- Current
- Future

Sources:
1. City Limits - City of Vernonia, 2010
2. Parks and Streets - City of Vernonia, 2010
3. Waterbodies - PNW Hydro, 2005
4. Community Facilities and Churches - CH2M Hill, 2010

N

0 250 500 1,000
Feet

FIGURE 3
Vernonia Community Facilities
Vernonia Transportation System Plan
City of Vernonia, Oregon

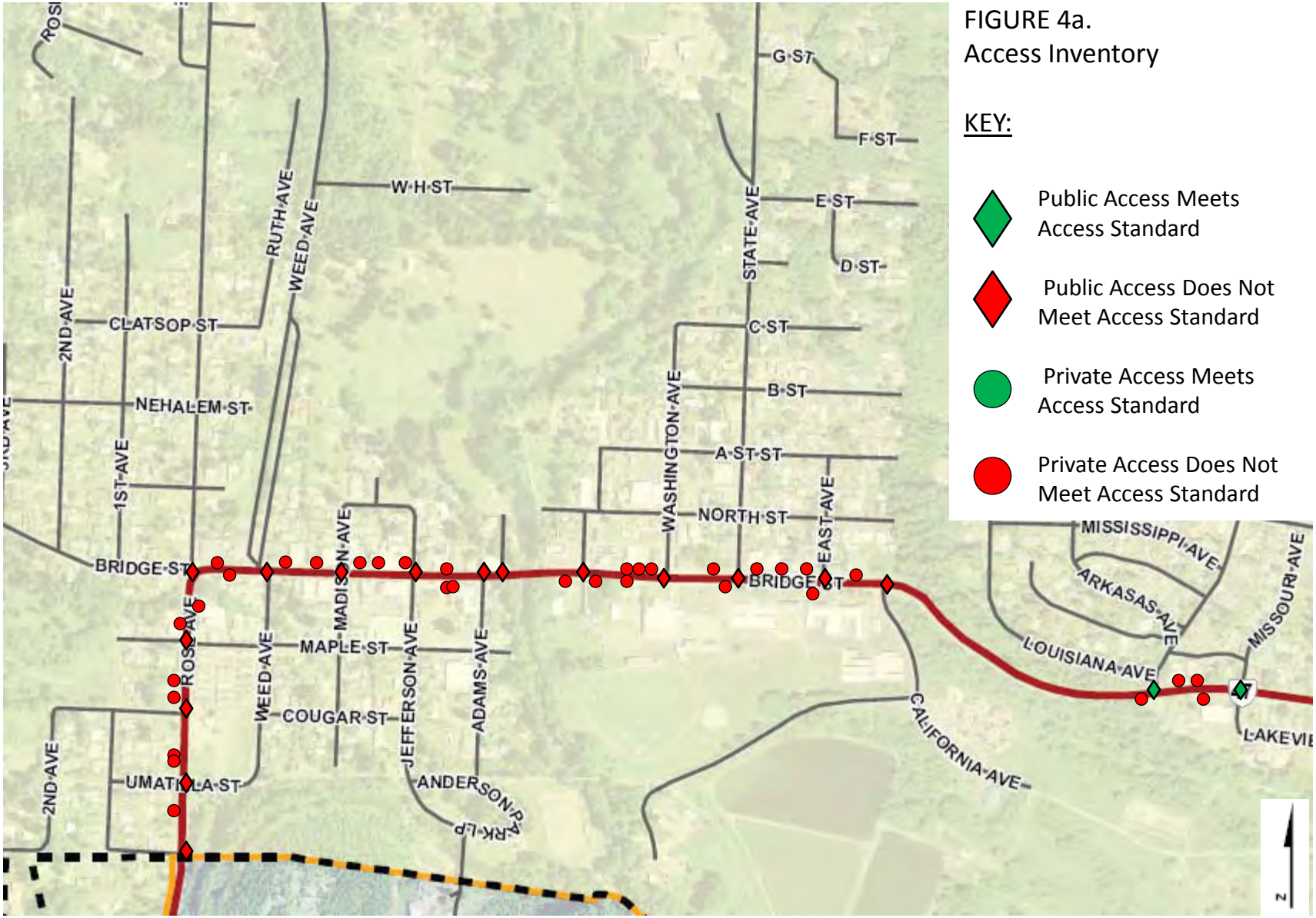
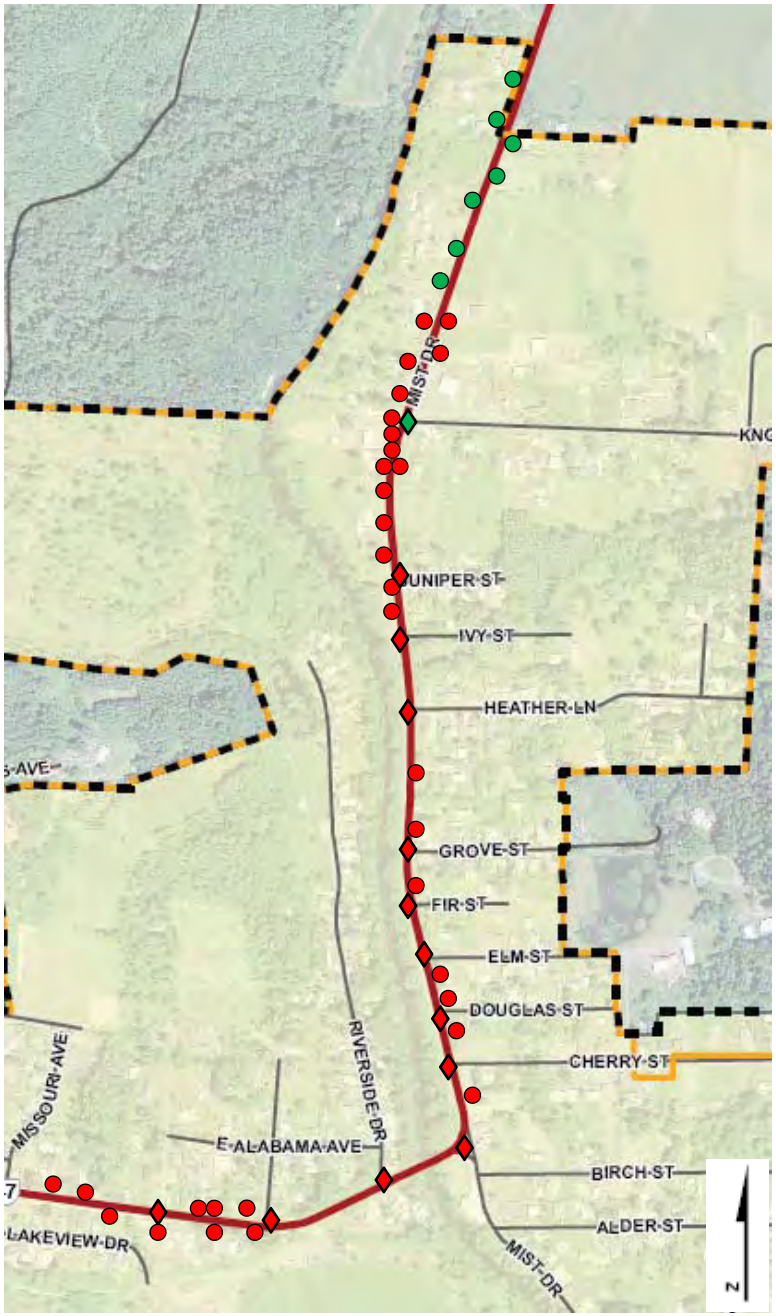


FIGURE 4a.
Access Inventory

KEY:

- Public Access Meets Access Standard
- Public Access Does Not Meet Access Standard
- Private Access Meets Access Standard
- Private Access Does Not Meet Access Standard

Note: Driveway locations are approximate.

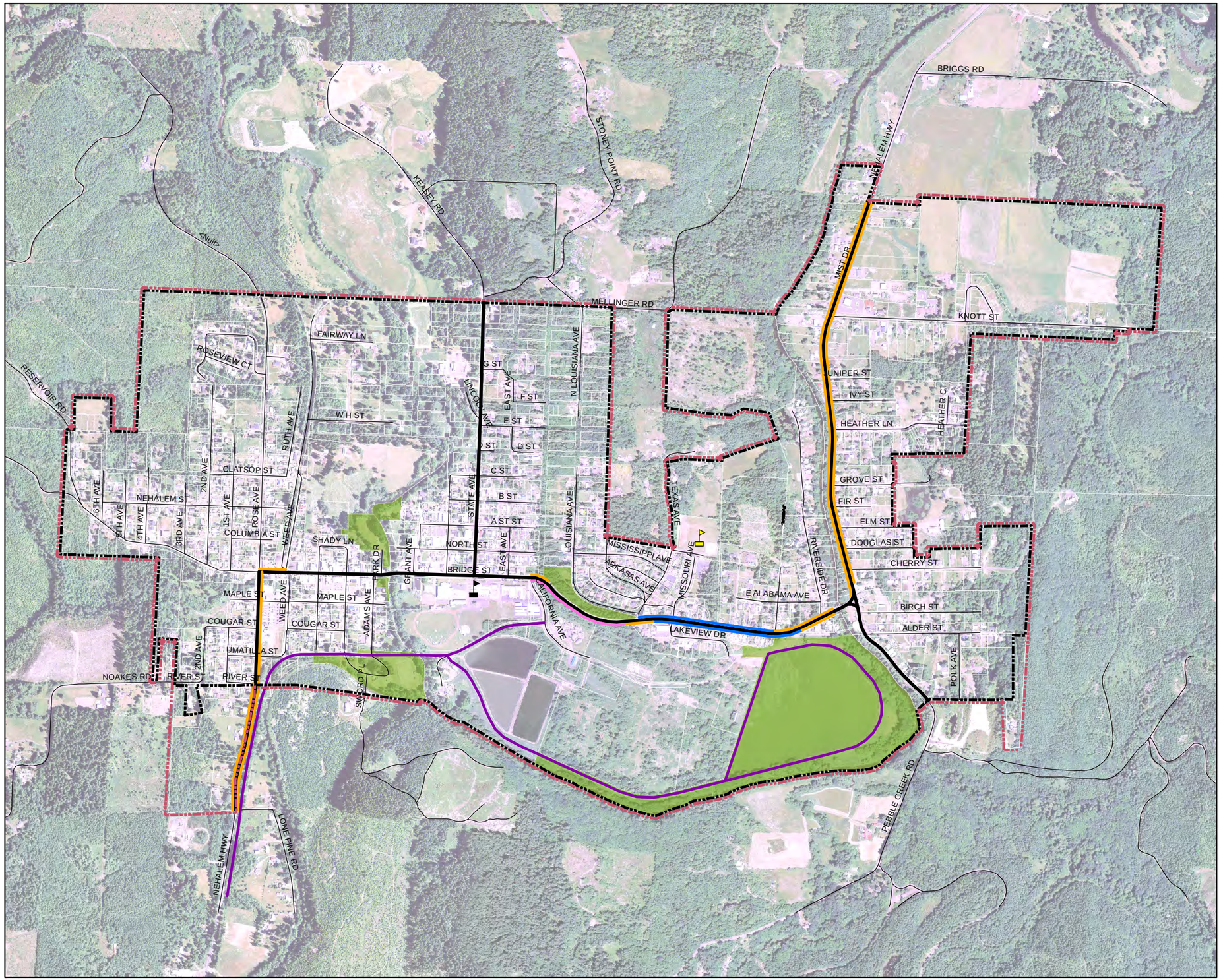


Note: Driveway locations are approximate.

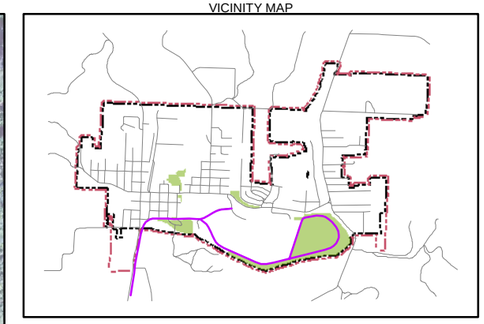
FIGURE 4b.
Access Inventory

Key:

- Public Access Meets Access Standard
- Public Access Does Not Meet Access Standard
- Private Access Meets Access Standard
- Private Access Does Not Meet Access Standard



VICINITY MAP



LEGEND

- Existing Vernonia Schools
- Future Site of Vernonia Schools

Bike Facilities Inventory

- Bike Lane
- Shoulder Sidepath
- Shoulder
- Shared-Use Paths
- Inventoried Streets (Arterials & Collectors)
- Streets
- Parks
- City Limits
- Vernonia TSP Study Area

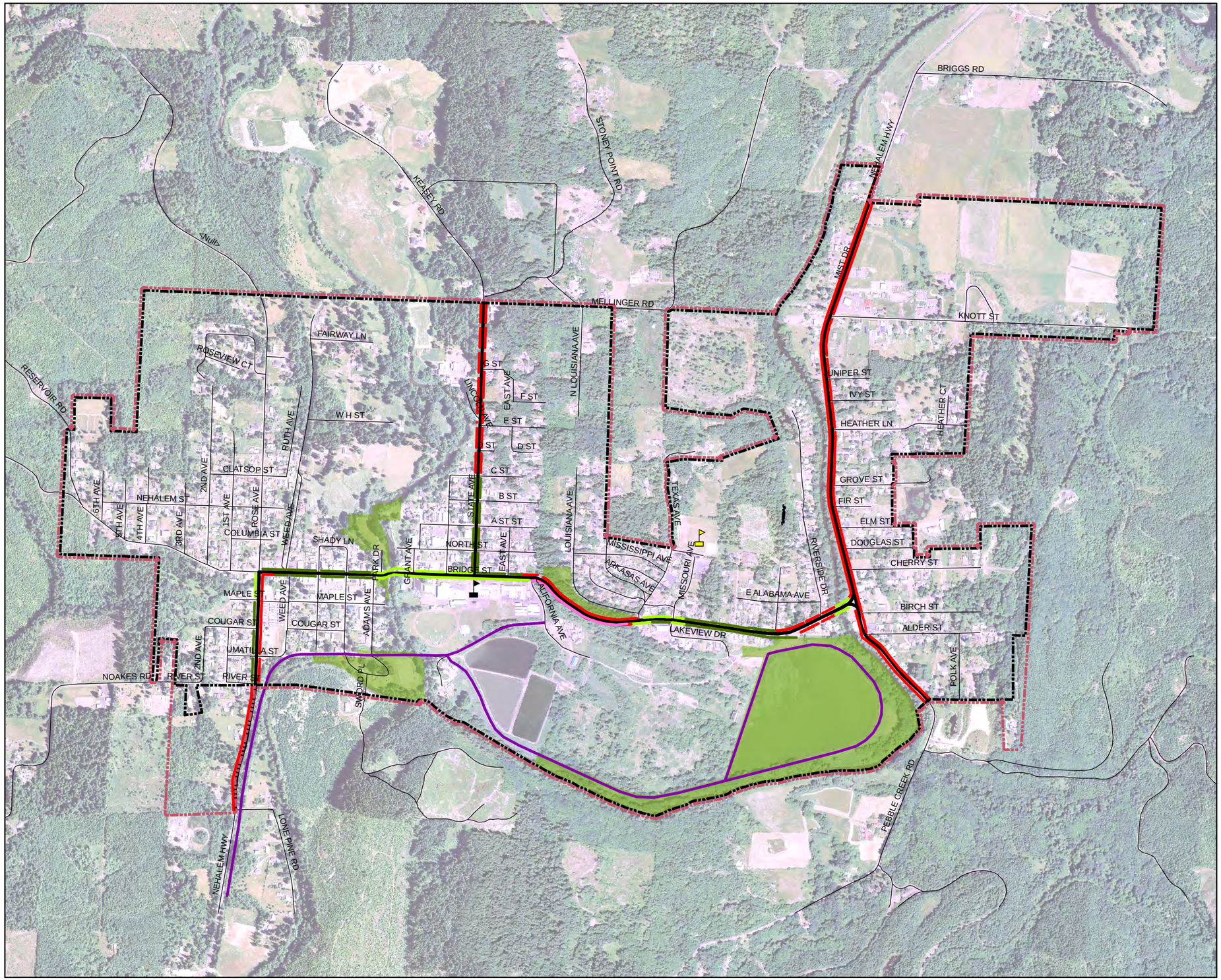
Sources:
1. UGB and City Limits - City of Vernonia, 2010
2. Streets - City of Vernonia, 2010

N

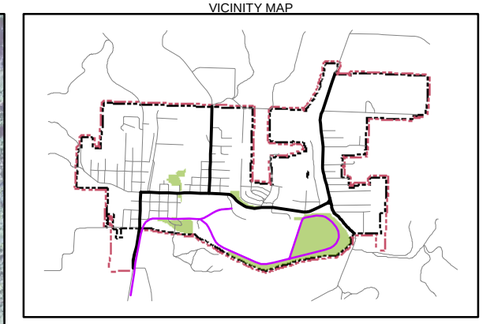
0 250 500 1,000 1,500 2,000
Feet

FIGURE 5
Bicycle Facilities Inventory
Technical Memo #2
Vernonia TSP

RDD \\LOKI\APPS\ESRI\ARCMAPTEMPLATES\MXD\TABLOID_LANDSCAPE.MXD 9/19/2007 14:40:58



VICINITY MAP



LEGEND

- Existing Vernonia Schools
- Future Site of Vernonia Schools

Pedestrian Facilities Inventory

- Attached Sidewalk
- Detached Sidewalk
- Sidewalk Missing
- Shoulder Sidepath
- Shared-Use Paths
- Inventoried Streets (Arterials & Collectors)
- Streets
- Parks
- City Limits
- Vernonia TSP Study Area

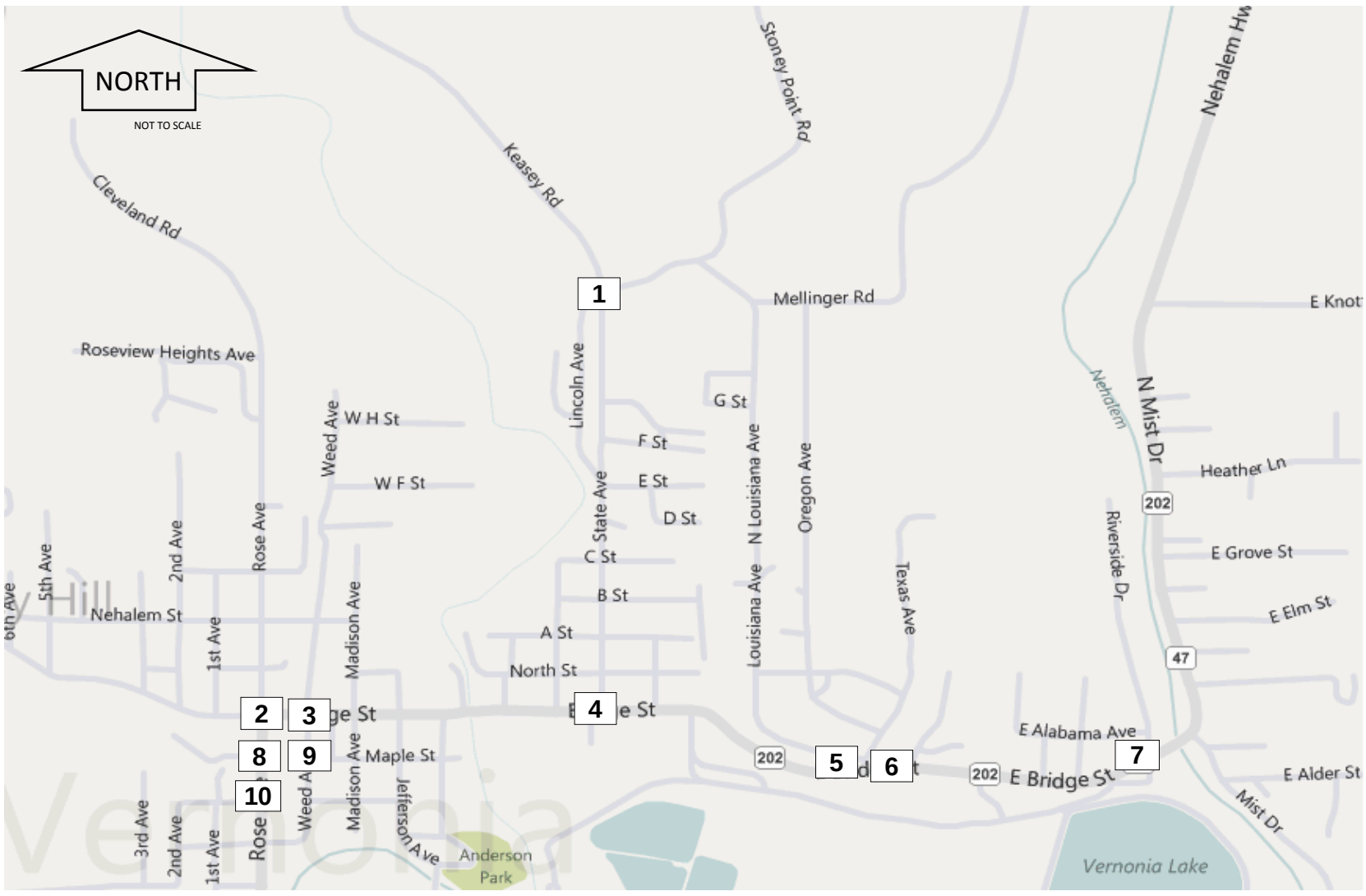
Sources:
1. UGB and City Limits - City of Vernonia, 2010
2. Streets - City of Vernonia, 2010

N

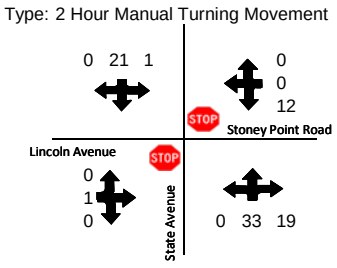
0 250 500 1,000 1,500 2,000
Feet

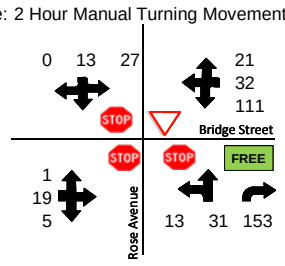
FIGURE 6
Pedestrian Facilities Inventory
Technical Memo #2
Vernonia TSP

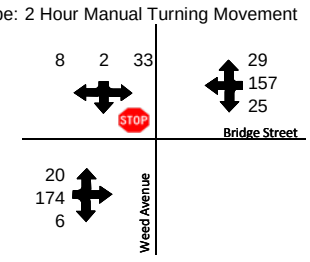
Attachment A Traffic Analysis

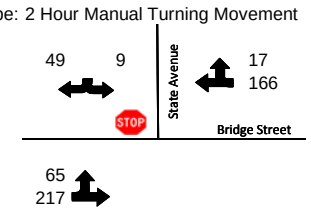


1	Stoney Point Road/State Avenue	2	Bridge Street/Rose Avenue	3	Bridge Street/Weed Avenue	4	Bridge Street/State Avenue
Peak Hour:	4:00 PM to 5:00 PM	Peak Hour:	4:00 PM to 5:00 PM	Peak Hour:	4:00 PM to 5:00 PM	Peak Hour:	4:00 PM to 5:00 PM
Date:	April 15th, 2008	Date:	March 10th, 2010	Date:	March 10th, 2010	Date:	April 15th, 2008
Type:	2 Hour Manual Turning Movement	Type:	2 Hour Manual Turning Movement	Type:	2 Hour Manual Turning Movement	Type:	2 Hour Manual Turning Movement

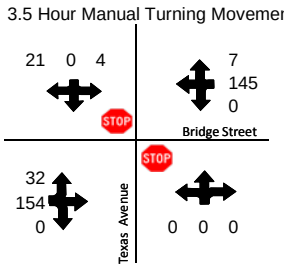


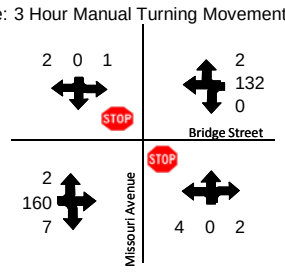


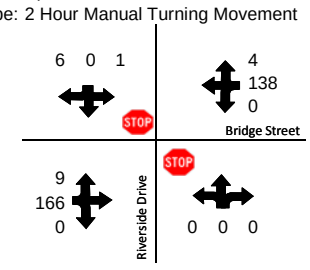


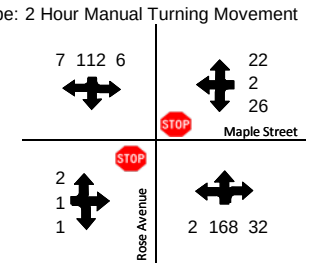


5	Bridge Street/Texas Avenue	6	Bridge Street/Missouri Avenue	7	Bridge Street/Riverside Drive	8	Maple Street/Rose Avenue
Peak Hour:	3:45 PM to 4:45 PM	Peak Hour:	4:00 PM to 5:00 PM	Peak Hour:	4:30 PM to 5:30 PM	Peak Hour:	4:00 PM to 5:00 PM
Date:	December 2nd, 2009	Date:	December 2nd, 2009	Date:	April 24th, 2008	Date:	March 10th, 2010
Type:	3.5 Hour Manual Turning Movement	Type:	3 Hour Manual Turning Movement	Type:	2 Hour Manual Turning Movement	Type:	2 Hour Manual Turning Movement

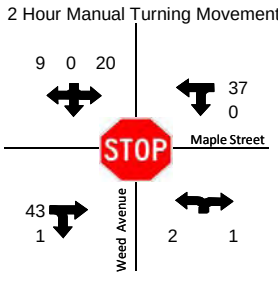


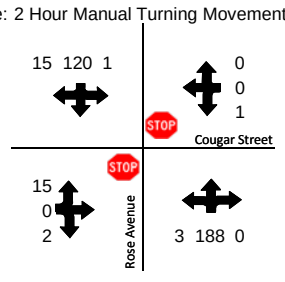




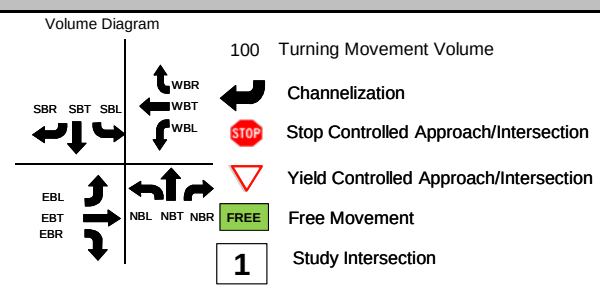


9	Maple Street/Weed Avenue	10	Cougar Street/Rose Street
Peak Hour:	4:00 PM to 5:00 PM	Peak Hour:	4:00 PM to 5:00 PM
Date:	March 10th, 2010	Date:	March 10th, 2010
Type:	2 Hour Manual Turning Movement	Type:	2 Hour Manual Turning Movement





Legend:

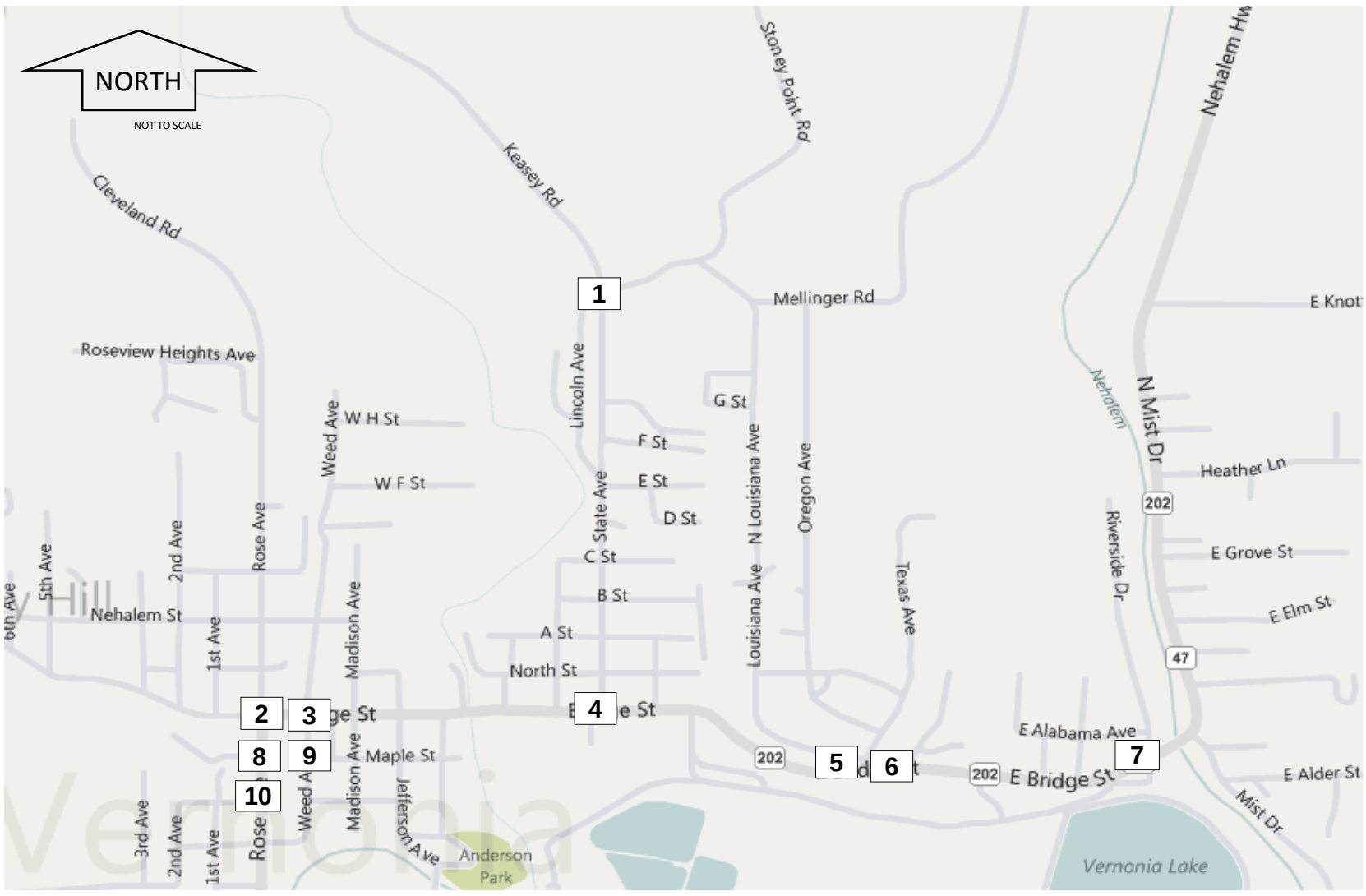


Notes:

Map Source: www.bing.com/maps

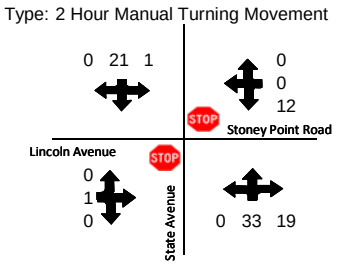
FIGURE A.1 Raw Count: 2008-2010 Individual Intersection Peak Hour Volumes & Channelization

Vernonia Transportation System Plan



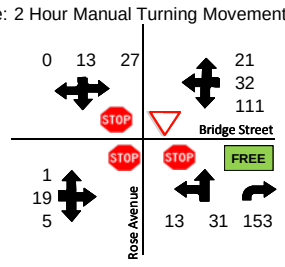
1 Stoney Point Road/State Avenue

Peak Hour: 4:00 PM to 5:00 PM
Date: April 15th, 2008
Type: 2 Hour Manual Turning Movement



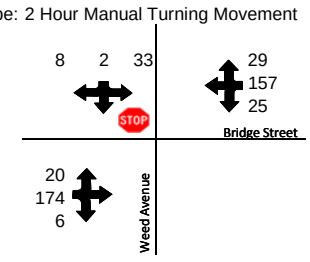
2 Bridge Street/Rose Avenue

Peak Hour: 4:00 PM to 5:00 PM
Date: March 10th, 2010
Type: 2 Hour Manual Turning Movement



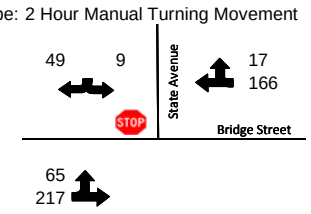
3 Bridge Street/Weed Avenue

Peak Hour: 4:00 PM to 5:00 PM
Date: March 10th, 2010
Type: 2 Hour Manual Turning Movement



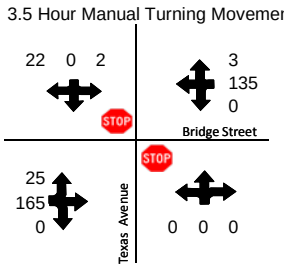
4 Bridge Street/State Avenue

Peak Hour: 4:00 PM to 5:00 PM
Date: April 15th, 2008
Type: 2 Hour Manual Turning Movement



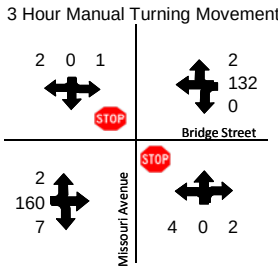
5 Bridge Street/Texas Avenue

Peak Hour: 4:00 PM to 5:00 PM
Date: December 2nd, 2009
Type: 3.5 Hour Manual Turning Movement



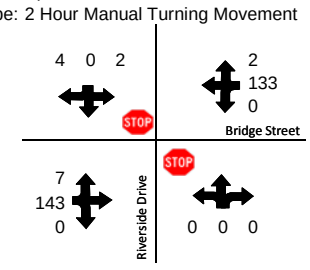
6 Bridge Street/Missouri Avenue

Peak Hour: 4:00 PM to 5:00 PM
Date: December 2nd, 2009
Type: 3 Hour Manual Turning Movement



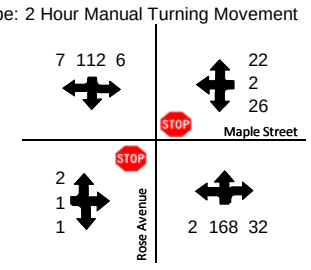
7 Bridge Street/Riverside Drive

Peak Hour: 4:00 PM to 5:00 PM
Date: April 24th, 2008
Type: 2 Hour Manual Turning Movement



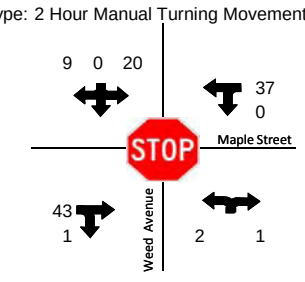
8 Maple Street/Rose Avenue

Peak Hour: 4:00 PM to 5:00 PM
Date: March 10th, 2010
Type: 2 Hour Manual Turning Movement



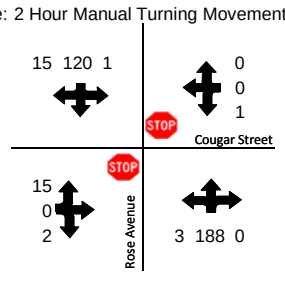
9 Maple Street/Weed Avenue

Peak Hour: 4:00 PM to 5:00 PM
Date: March 10th, 2010
Type: 2 Hour Manual Turning Movement

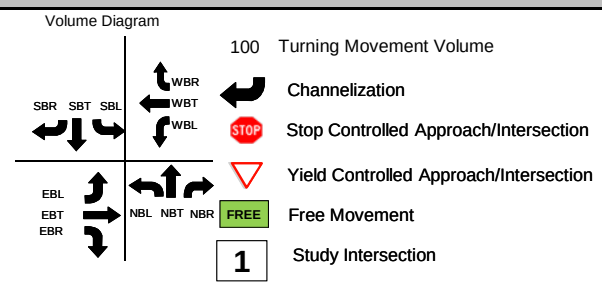


10 Cougar Street/Rose Street

Peak Hour: 4:00 PM to 5:00 PM
Date: March 10th, 2010
Type: 2 Hour Manual Turning Movement



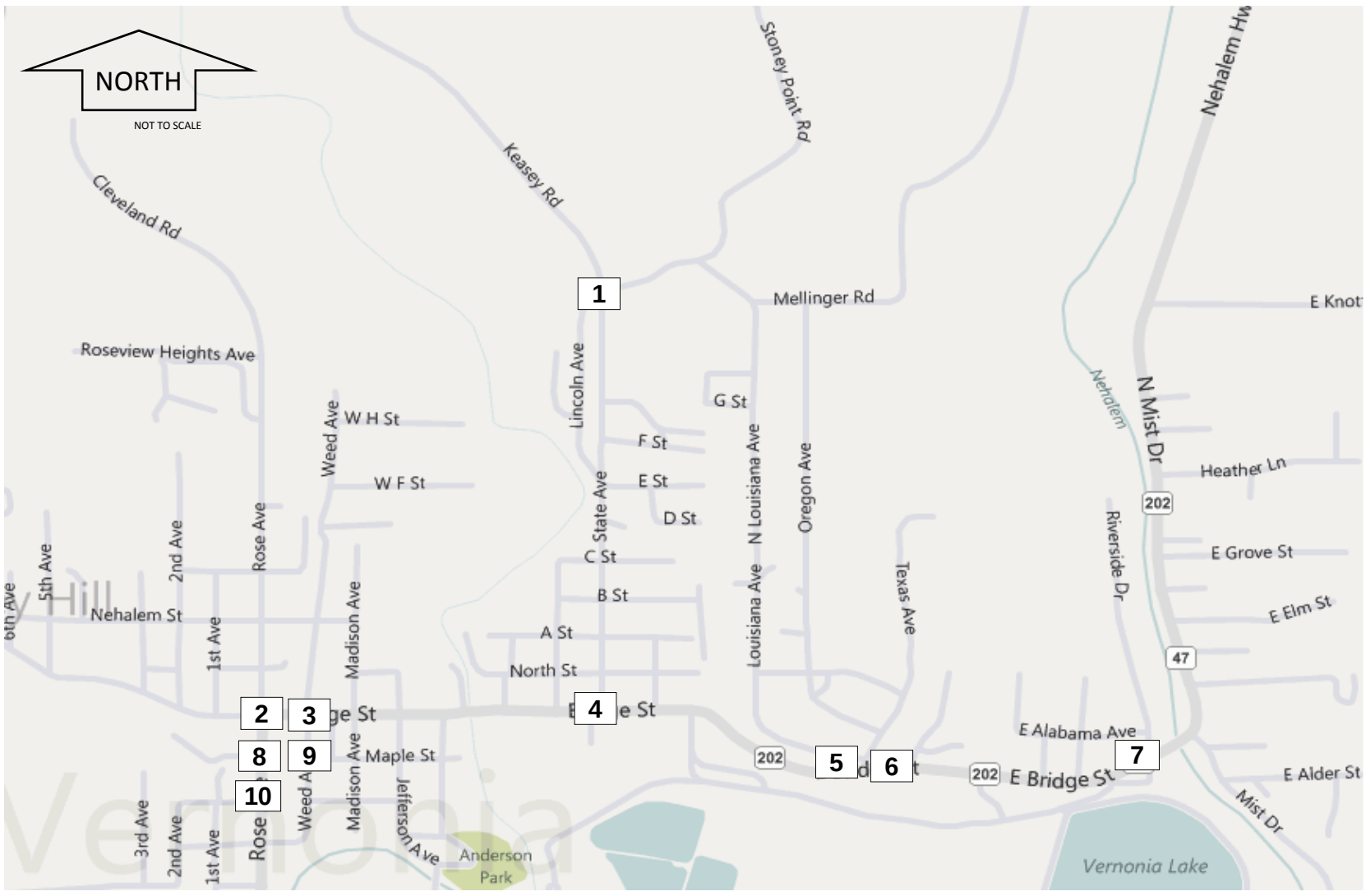
Legend:



Notes:

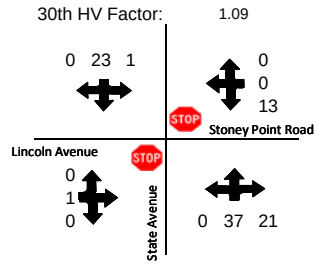
1. Map Source: www.bing.com/maps
2. System peak hour occurred between 4:00 PM to 5:00 PM.
3. System peak hour was based on the individual peak hour of the majoirty of intersections.

FIGURE A.2 Raw System Peak: 2008-2010 Individual Intersection Peak Hour Volumes & Channelization
Vernonia Transportation System Plan



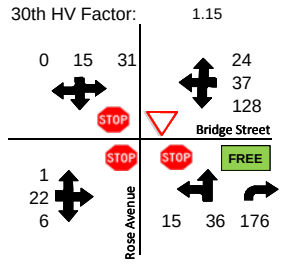
1 Stoney Point Road/State Avenue

Date: April 15th, 2008
Growth Factor: 1.02
30th HV Factor: 1.09



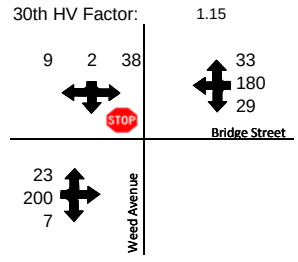
2 Bridge Street/Rose Avenue

Date: March 10th, 2010
Growth Factor: 1.00
30th HV Factor: 1.15



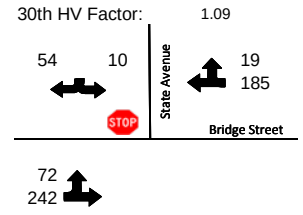
3 Bridge Street/Weed Avenue

Date: March 10th, 2010
Growth Factor: 1.00
30th HV Factor: 1.15



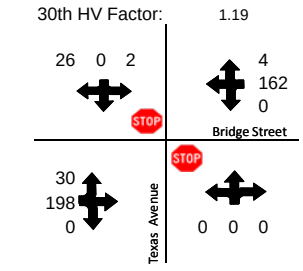
4 Bridge Street/State Avenue

Date: April 15th, 2008
Growth Factor: 1.02
30th HV Factor: 1.09



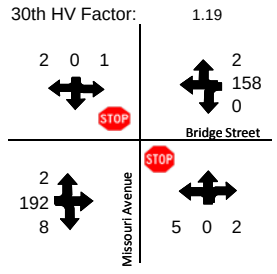
5 Bridge Street/Texas Avenue

Date: December 2nd, 2009
Growth Factor: 1.01
30th HV Factor: 1.19



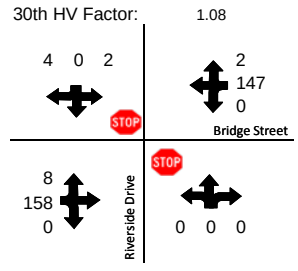
6 Bridge Street/Missouri Avenue

Date: December 2nd, 2009
Growth Factor: 1.01
30th HV Factor: 1.19



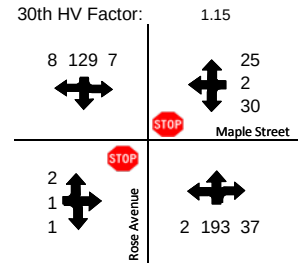
7 Bridge Street/Riverside Drive

Date: April 24th, 2008
Growth Factor: 1.02
30th HV Factor: 1.08



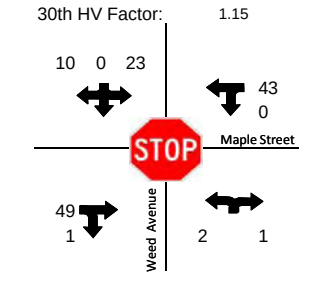
8 Maple Street/Rose Avenue

Date: March 10th, 2010
Growth Factor: 1.00
30th HV Factor: 1.15



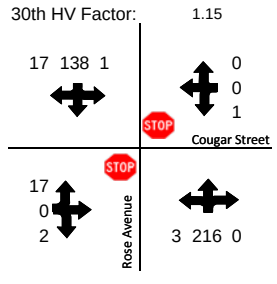
9 Maple Street/Weed Avenue

Date: March 10th, 2010
Growth Factor: 1.00
30th HV Factor: 1.15

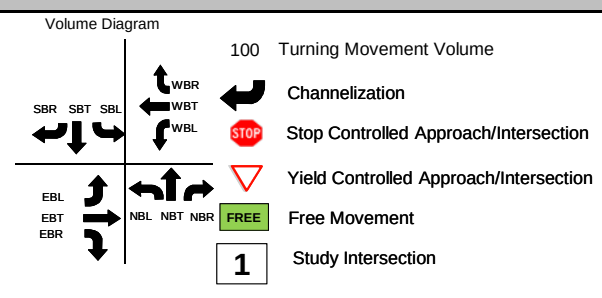


10 Cougar Street/Rose Street

Date: March 10th, 2010
Growth Factor: 1.00
30th HV Factor: 1.15



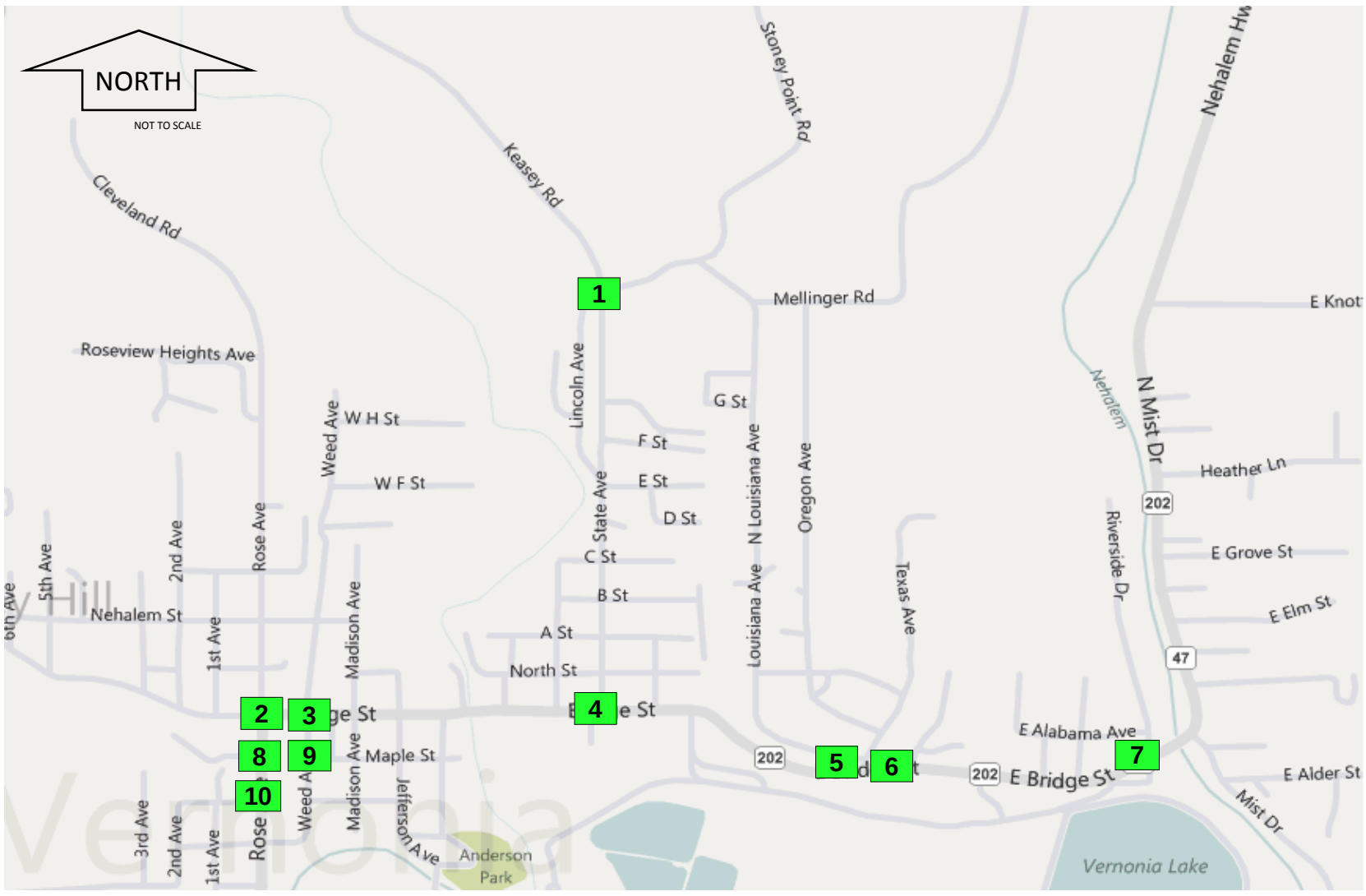
Legend:



Notes:

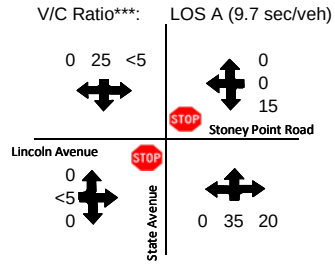
1. Map Source: www.bing.com/maps
2. System peak hour occurred between 4:00 PM to 5:00 PM.
3. System peak hour was based on the individual peak hour of the majoirty of intersections.
4. Annual growth factor was assumed to be 1 percent/year per ODOT Region 1 Traffic.
5. 30th highest hour factor is derived from ATR station 03-013.

FIGURE A.3 Unrounded and Unbalanced Existing 30th Highest Hour Volumes & Channelization
Vernonia Transportation System Plan



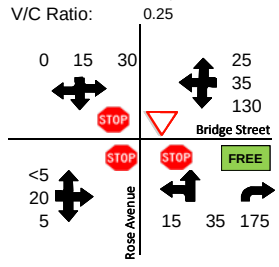
1 Stoney Point Road/State Avenue

Date: April 15th, 2008
V/C Ratio Std: LOS D
V/C Ratio***: LOS A (9.7 sec/veh)



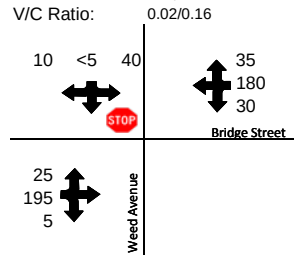
2 Bridge Street/Rose Avenue

Date: March 10th, 2010
V/C Ratio Std: 0.95/0.95
V/C Ratio: 0.25



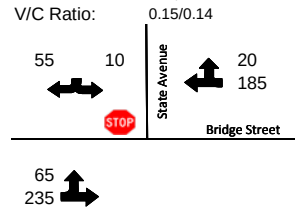
3 Bridge Street/Weed Avenue

Date: March 10th, 2010
V/C Ratio Std: 0.95/0.95
V/C Ratio: 0.02/0.16



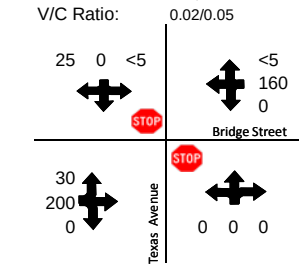
4 Bridge Street/State Avenue

Date: April 15th, 2008
V/C Ratio Std: 0.90/0.90
V/C Ratio: 0.15/0.14



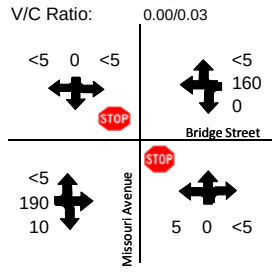
5 Bridge Street/Texas Avenue

Date: December 2nd, 2009
V/C Ratio Std: 0.90/0.90
V/C Ratio: 0.02/0.05



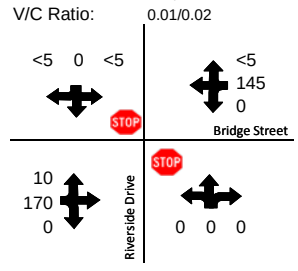
6 Bridge Street/Missouri Avenue

Date: December 2nd, 2009
V/C Ratio Std: 0.90/0.90
V/C Ratio: 0.00/0.03



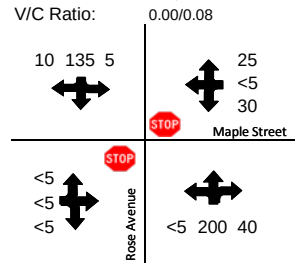
7 Bridge Street/Riverside Drive

Date: April 24th, 2008
V/C Ratio Std: 0.90/0.90
V/C Ratio: 0.01/0.02



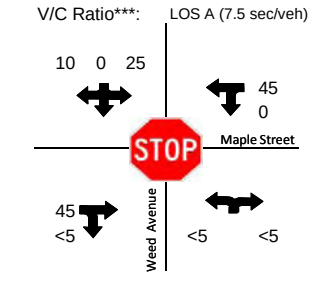
8 Maple Street/Rose Avenue

Date: March 10th, 2010
V/C Ratio Std: 0.90/0.90
V/C Ratio: 0.00/0.08



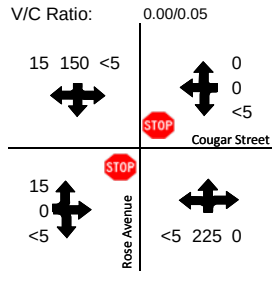
9 Maple Street/Weed Avenue

Date: March 10th, 2010
V/C Ratio Std: LOS D
V/C Ratio***: LOS A (7.5 sec/veh)

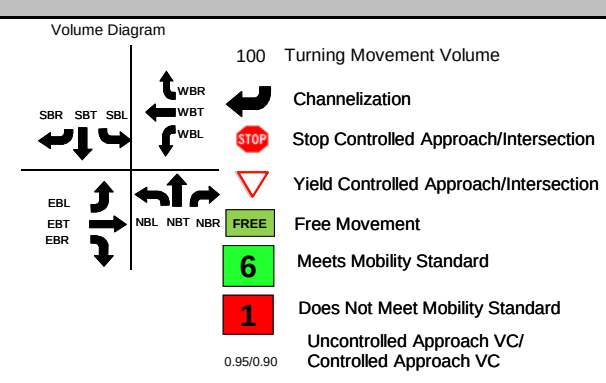


10 Cougar Street/Rose Street

Date: March 10th, 2010
V/C Ratio Std: 0.90/0.90
V/C Ratio: 0.00/0.05



Legend:



Notes:

1. Map Source: www.bing.com/maps
2. System peak hour occurred between 4:00 PM to 5:00 PM.
3. Mobility Standards are based on the Oregon Highway Plan or City of Vernonia LOS Standards.
4. Synchro software version 7 used for analysis.
5. VC = Volume to Capacity Ratio
6. V/C Ratio Std = Intersection Mobility Standard (per ODOT)

*** City of Vernonia has a LOS D mobility standard. LOS (avg delay/veh) is reported for the worst operating movement (for TWSC) and total intersection (for AWSC).

FIGURE A.4 Rounded and Balanced Existing 30th Highest Hour Volumes, Channelization, and Operations
Vernonia Transportation System Plan

HCM Unsignalized Intersection Capacity Analysis
1: Stoney Point Rd & State St

10/25/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	1	0	15	0	0	0	35	20	1	25	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.25	0.25	0.25	0.60	0.60	0.60	0.76	0.76	0.76	0.61	0.61	0.61
Hourly flow rate (vph)	0	4	0	25	0	0	0	46	26	2	41	0
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	103	117	41	105	103	59	41			72		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	103	117	41	105	103	59	41			72		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	100	99	100	97	100	100	100			100		
cM capacity (veh/h)	881	777	1036	875	789	1012	1568			1484		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	4	25	72	43
Volume Left	0	25	0	2
Volume Right	0	0	26	0
cSH	777	875	1568	1484
Volume to Capacity	0.01	0.03	0.00	0.00
Queue Length 95th (ft)	0	2	0	0
Control Delay (s)	9.7	9.2	0.0	0.3
Lane LOS	A	A		A
Approach Delay (s)	9.7	9.2	0.0	0.3
Approach LOS	A	A		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	17.6%	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			Yield			Stop			Stop	
Volume (vph)	1	20	5	130	35	25	15	35	175	30	15	0
Peak Hour Factor	0.69	0.69	0.69	0.91	0.91	0.91	0.74	0.74	0.74	0.67	0.67	0.67
Hourly flow rate (vph)	1	29	7	143	38	27	20	47	236	45	22	0

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	38	209	68	236	67
Volume Left (vph)	1	143	20	0	45
Volume Right (vph)	7	27	0	236	0
Hadj (s)	-0.11	0.09	0.13	-0.53	0.13
Departure Headway (s)	4.4	4.4	4.7	3.2	4.7
Degree Utilization, x	0.05	0.25	0.09	0.21	0.09
Capacity (veh/h)	788	792	723	1122	722
Control Delay (s)	7.6	8.8	8.1	7.0	8.1
Approach Delay (s)	7.6	8.8	7.3		8.1
Approach LOS	A	A	A		A

Intersection Summary			
Delay	7.9		
HCM Level of Service	A		
Intersection Capacity Utilization	34.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	195	5	30	180	35	0	0	0	40	2	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.96	0.96	0.96	0.92	0.92	0.92	0.77	0.77	0.77
Hourly flow rate (vph)	32	250	6	31	188	36	0	0	0	52	3	13
Pedestrians					3			4			12	
Lane Width (ft)					12.0			0.0			12.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	236			260			604	620	260	601	605	218
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	236			260			604	620	260	601	605	218
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			98			100	100	100	87	99	98
cM capacity (veh/h)	1312			1310			384	381	776	390	388	814

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	288	255	68
Volume Left	32	31	52
Volume Right	6	36	13
cSH	1312	1310	433
Volume to Capacity	0.02	0.02	0.16
Queue Length 95th (ft)	2	2	14
Control Delay (s)	1.1	1.1	14.8
Lane LOS	A	A	B
Approach Delay (s)	1.1	1.1	14.8
Approach LOS			B

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	29.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	65	235	185	20	10	55
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.78	0.78	0.83	0.83	0.69	0.69
Hourly flow rate (vph)	83	301	223	24	14	80
Pedestrians		1	7		6	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		0	1		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	253				716	242
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	253				716	242
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	94				96	90
cM capacity (veh/h)	1300				361	780

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	385	247	94
Volume Left	83	0	14
Volume Right	0	24	80
cSH	1300	1700	662
Volume to Capacity	0.06	0.15	0.14
Queue Length 95th (ft)	5	0	12
Control Delay (s)	2.2	0.0	11.3
Lane LOS	A		B
Approach Delay (s)	2.2	0.0	11.3
Approach LOS			B

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	200	0	0	160	4	0	0	0	2	0	25
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.75	0.75	0.75	0.92	0.92	0.92	0.75	0.75	0.75
Hourly flow rate (vph)	32	215	0	0	213	5	0	0	0	3	0	33
Pedestrians		1			2							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		0			0							
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	219			215			530	498	217	498	496	217
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	219			215			530	498	217	498	496	217
tC, single (s)	4.2			4.2			7.1	6.5	6.2	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.5	4.0	3.3	3.6	4.1	3.4
p0 queue free %	98			100			100	100	100	99	100	96
cM capacity (veh/h)	1327			1314			432	462	821	458	450	798

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	247	219	0	36
Volume Left	32	0	0	3
Volume Right	0	5	0	33
cSH	1327	1314	1700	756
Volume to Capacity	0.02	0.00	0.00	0.05
Queue Length 95th (ft)	2	0	0	4
Control Delay (s)	1.2	0.0	0.0	10.0
Lane LOS	A		A	A
Approach Delay (s)	1.2	0.0	0.0	10.0
Approach LOS			A	A

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	190	10	0	160	2	5	0	2	1	0	2
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.82	0.82	0.82	0.35	0.35	0.35	0.44	0.44	0.44
Hourly flow rate (vph)	2	211	11	0	195	2	14	0	6	2	0	5
Pedestrians		1						3				
Lane Width (ft)		12.0						12.0				
Walking Speed (ft/s)		4.0						4.0				
Percent Blockage		0						0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	198			225			426	422	220	423	426	197
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	198			225			426	422	220	423	426	197
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.4	6.8	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.8	4.3	3.6
p0 queue free %	100			100			97	100	99	100	100	99
cM capacity (veh/h)	1363			1311			536	524	823	486	474	770

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	224	198	20	7
Volume Left	2	0	14	2
Volume Right	11	2	6	5
cSH	1363	1311	595	645
Volume to Capacity	0.00	0.00	0.03	0.01
Queue Length 95th (ft)	0	0	3	1
Control Delay (s)	0.1	0.0	11.3	10.6
Lane LOS	A		B	B
Approach Delay (s)	0.1	0.0	11.3	10.6
Approach LOS			B	B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	23.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	170	0	0	145	2	0	0	0	2	0	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.92	0.92	0.92	0.38	0.38	0.38
Hourly flow rate (vph)	12	212	0	0	181	2	0	0	0	5	0	11
Pedestrians								2				
Lane Width (ft)								12.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	184			214			433	423	214	420	422	182
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	184			214			433	423	214	420	422	182
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			100	100	100	99	100	99
cM capacity (veh/h)	1373			1324			525	520	829	543	521	865

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	225	184	0	16
Volume Left	12	0	0	5
Volume Right	0	2	0	11
cSH	1373	1324	1700	722
Volume to Capacity	0.01	0.00	0.00	0.02
Queue Length 95th (ft)	1	0	0	2
Control Delay (s)	0.5	0.0	0.0	10.1
Lane LOS	A		A	B
Approach Delay (s)	0.5	0.0	0.0	10.1
Approach LOS			A	B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	28.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	2	1	1	30	2	25	2	200	40	5	135	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.78	0.78	0.78	0.79	0.79	0.79	0.89	0.89	0.89
Hourly flow rate (vph)	4	2	2	38	3	32	3	253	51	6	152	11
Pedestrians		4			1			4				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		0			0			0				
Right turn flare (veh)						1						
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	473	482	165	460	463	279	167			305		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	473	482	165	460	463	279	167			305		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.2			2.2		
p0 queue free %	99	100	100	92	99	96	100			100		
cM capacity (veh/h)	475	482	878	493	482	745	1394			1255		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	8	73	306	169
Volume Left	4	38	3	6
Volume Right	2	32	51	11
cSH	539	876	1394	1255
Volume to Capacity	0.01	0.08	0.00	0.00
Queue Length 95th (ft)	1	7	0	0
Control Delay (s)	11.8	11.7	0.1	0.3
Lane LOS	B	B	A	A
Approach Delay (s)	11.8	11.7	0.1	0.3
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	32.1%	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			Stop			Stop	
Volume (vph)	0	45	1	0	45	0	2	0	1	25	0	10
Peak Hour Factor	0.65	0.65	0.65	0.66	0.66	0.66	0.75	0.75	0.75	0.81	0.81	0.81
Hourly flow rate (vph)	0	69	2	0	68	0	3	0	1	31	0	12

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	71	68	4	43
Volume Left (vph)	0	0	3	31
Volume Right (vph)	2	0	1	12
Hadj (s)	0.07	0.05	0.49	0.02
Departure Headway (s)	4.1	4.1	4.7	4.2
Degree Utilization, x	0.08	0.08	0.01	0.05
Capacity (veh/h)	851	856	727	821
Control Delay (s)	7.5	7.5	7.8	7.5
Approach Delay (s)	7.5	7.5	7.8	7.5
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.5		
HCM Level of Service	A		
Intersection Capacity Utilization	19.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	0	2	1	0	0	3	225	0	1	150	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.61	0.61	0.61	0.25	0.25	0.25	0.76	0.76	0.76	0.87	0.87	0.87
Hourly flow rate (vph)	25	0	3	4	0	0	4	296	0	1	172	17
Pedestrians		8										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		4.0										
Percent Blockage		1										
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	495	495	189	491	504	296	198			296		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	495	495	189	491	504	296	198			296		
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 %	95	100	100	99	100	100	100			100		
cM capacity (veh/h)	481	474	852	486	468	748	1360			1265		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	28	4	300	191
Volume Left	25	4	4	1
Volume Right	3	0	0	17
cSH	507	486	1360	1265
Volume to Capacity	0.05	0.01	0.00	0.00
Queue Length 95th (ft)	4	1	0	0
Control Delay (s)	12.5	12.5	0.1	0.1
Lane LOS	B	B	A	A
Approach Delay (s)	12.5	12.5	0.1	0.1
Approach LOS	B	B		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	25.1%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 1: Stoney Point Rd & State St

Movement	EB	WB
Directions Served	LTR	LR
Maximum Queue (ft)	30	38
Average Queue (ft)	2	14
95th Queue (ft)	14	39
Link Distance (ft)	524	999
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 2: Bridge St & Rose Ave

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	LT	R	LTR
Maximum Queue (ft)	50	56	74	77	54
Average Queue (ft)	22	10	28	8	25
95th Queue (ft)	51	38	57	45	51
Link Distance (ft)	1293	224	265		448
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				75	
Storage Blk Time (%)			0	0	
Queuing Penalty (veh)			0	0	

Intersection: 3: Bridge St & Weed Ave

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	19	63	71
Average Queue (ft)	1	11	32
95th Queue (ft)	9	43	64
Link Distance (ft)	224	2044	618
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Bridge St & State St

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	92	7	76
Average Queue (ft)	24	0	34
95th Queue (ft)	71	6	65
Link Distance (ft)	2044	1938	3068
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Bridge St & Texas Ave

Movement	EB	WB	SB
Directions Served	LTR	LTR	LR
Maximum Queue (ft)	47	15	74
Average Queue (ft)	5	1	18
95th Queue (ft)	27	14	50
Link Distance (ft)	1938	295	1761
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Bridge St & Missouri Ave

Movement	NB	SB
Directions Served	LR	LR
Maximum Queue (ft)	24	34
Average Queue (ft)	5	3
95th Queue (ft)	21	18
Link Distance (ft)	294	320
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Bridge St & Riverside Dr

Movement	EB	SB
Directions Served	LTR	LR
Maximum Queue (ft)	35	30
Average Queue (ft)	2	4
95th Queue (ft)	17	20
Link Distance (ft)	1614	674
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Maple St & Rose Ave

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	31	62	54	7	21
Average Queue (ft)	4	24	20	0	1
95th Queue (ft)	20	54	55	5	9
Link Distance (ft)	488	298		252	265
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			25		
Storage Blk Time (%)		3	2		
Queuing Penalty (veh)		1	1		

Intersection: 9: Maple St & Weed Ave

Movement	EB	WB	NB	SB
Directions Served	TR	LT	LR	LR
Maximum Queue (ft)	70	45	47	50
Average Queue (ft)	28	19	4	26
95th Queue (ft)	58	42	25	52
Link Distance (ft)	298	630	226	264
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 10: Cougar St & Rose Ave

Movement	EB	WB
Directions Served	LR	LR
Maximum Queue (ft)	43	20
Average Queue (ft)	14	1
95th Queue (ft)	43	10
Link Distance (ft)	548	236
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 2

City of Vernonia TSP Update

Population	2340	
ADT	4000	
2-lane	District Highway	
Weekday	Rural Populated	
ATR Range	3600	4400
Highway 102	MP 62.5	

NO ONSITE OR NEARBY ATR!

Note: Table was modifed to include 2009 Seasonal Trends for ATR Station 03-013 and seasonal adjustment interpolation calculations.
-JDJ

1. Similar ATR Method

			Trend	Area	Facility		Classifica	ADT	Designation		Population			
BEST METHOD	-2.50%	**ATR 03-013**	*Aggricultural*	*Rural*	2 lane	Weekday	District Hi	3900	OR 213 Cascade					
Marquam			31	28	31	30	31	30	31	31	30	31	30	31
03-013	Peak Month	Peak%	January	February	March	April	May	June	July	August	September	October	November	December
2009	August	109	93	94	96	102	105	105	106	109	108	103	98	91
2008	July	114	91	100	102	104	110	109	114	106	103	100	105	84
2007	June	112	84	96	101	103	107	109	110	112	109	102	100	89
2006	August	113	89	92	94	103	105	109	111	113	111	106	98	92
2005	August	111	92	95	97	101	105	109	110	111	107	103	102	94
	Average	112	91	95	98	103	106	109	110	111	108	103	100	91
	Factor		**1.2353**	**1.1789**	**1.1429**	**1.0909**	**1.0599**	**1.0275**	**1.0151**	**1.0120**	**1.0370**	**1.0909**	**1.1200**	**1.2353**

Seasonal Adjustment Interpolation

Month	Date	Days Ahead	Days Back	Month Ahead	Month Back	Seasonal Adj Factor
December	2	13	17	1.2353	1.1200	1.185
March	10	5	23	1.1429	1.1789	1.149
April	24	21	9	1.0599	1.0909	1.082

2. Seasonal Trend Table

			January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Peak**
AGRICULTURE			**1.1881**	**1.0732**	**1.0221**	**0.9854**	**0.9446**	**0.9240**	**0.8917**	**0.8940**	**0.9054**	**0.9336**	**0.9865**	**1.1632**	**0.8821**
Factor			**1.3469**	**1.2166**	**1.1587**	**1.1171**	**1.0709**	**1.0475**	**1.0109**	**1.0134**	**1.0264**	**1.0583**	**1.1184**	**1.3186**	

Yearly Growth Adjustment Factor

MP	**Location**	**2009 ADT**	**2008 ADT**	**2007 ADT**	**2006 AD**	**2005 ADT**	**2004 AD**	**2003 ADT**	**2002 ADT**	**2001 ADT**	**2000 ADT**	**1999 ADT**		Growth **2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**Avg**	
61.72	0.01 mile wes	5100	4000	4200	4200	3900	4000	4000	5300	5100	4900	4600		1.0652	1.0408	0.9623	0.7547	1.0000	0.9750	1.0769	1.0000	0.9524	1.2750	1.0102	
62.11	0.02 mile wes	6600	4800	5100	5000	4900	5000	5000	6500	6400	6300	5900		1.0678	1.0159	0.9846	0.7692	1.0000	0.9800	1.0204	1.0200	0.9412	1.3750	1.0174	
62.27	Rock Creek E	7200	5200	5400	5400	5300	5400	5400	6900	6800	6700	6700		1.0000	1.0149	0.9855	0.7826	1.0000	0.9815	1.0189	1.0000	0.9630	1.3846	1.0131	
62.52	0.02 mile eas	5200	3600	3800	3700	4200	4300	4300	5500	5400	5300	5200		1.0192	1.0189	0.9818	0.7818	1.0000	0.9767	0.8810	1.0270	0.9474	1.4444	1.0078	
62.56	0.02 mile sou	4100	3200	3400	3300	3600	3700	3700	4600	4500	4400	4200		1.0476	1.0227	0.9783	0.8043	1.0000	0.9730	0.9167	1.0303	0.9412	1.2813	0.9995	
62.79	0.02 mile sou	3900	3100	3300	3300	3300	3400	3400	4100	4000	3900	3800		1.0263	1.0256	0.9756	0.8293	1.0000	0.9706	1.0000	1.0000	0.9394	1.2581	1.0025	
	AVG	5350	3983	4200	4150	4200	4300	4300	5483	5367	5250	5067												1.008	Average

ANNUAL GROWTH

APPENDIX D

FUTURE CONDITIONS

Future Conditions and Needs: City of Vernonia Transportation System Plan Update

PREPARED FOR: Carole Connell, City of Vernonia
Bill Haack, City of Vernonia
Seth Brumley, ODOT

PREPARED BY: Joshua Johnson, CH2M HILL
Mariah VanZerr, CH2M HILL

COPIES: Larry Weymouth, CH2M HILL
Terra Lingley, CH2M HILL

DATE: November 15, 2010, Revised December 7, 2010

This memorandum builds upon existing conditions discussed in Project Memorandum #2: Existing Conditions and Needs. This memorandum describes the likely future 2031 land use needs and baseline transportation conditions within the Project Study Area given expected population growth, economic opportunities, typical development patterns, and existing plans, policies, and development codes.

Future Housing and Employment Needs

Housing Needs

Housing Needs Analysis

Housing needs were forecast to the year 2031 using a City of Vernonia population forecast of 2,711 persons. This forecast was based on 2030 population forecast data available from the report *Population Forecasts for Columbia County Oregon, its Cities and Unincorporated Areas* completed by Portland State University's Population Research Center, and adopted by the City in 2009. According to this report, Vernonia is projected to grow at a rate of 0.8% from 2010 to 2020. Population growth is expected to slow to 0.4% from 2020-2030. The average annual growth rate of 0.4% was applied to extend the 2030 population forecast to 2031.

TABLE 1
City of Vernonia Population Forecasts

	2010	2020	2030	2031
Population	2,405	2,605	2,700	2,711
Average Annual Growth Rate (AAGR)		0.8%	0.4%	0.4%

Source: PSU Population Research Center

Between 2009 and 2031 Vernonia is expected to see an increase in population of 400 persons. Additionally, according to the draft City of Vernonia Buildable Lands Inventory the average person per dwelling unit (APPDU) is expected to decline to 2.62 persons by 2030 due to the effects of an aging population. Assuming the APPDU remains the same in 2031, the City of Vernonia is projected to need 153 new dwelling units by 2031.

Forecast 2031 Land Need for Housing

Residential (R) and General Residential (GR) zoned land has a minimum lot size of 5,000 square feet, which equates to a maximum density of 8.7 dwelling units per acre. Low Density Residential (LDR) zoned land has a minimum lot size of 10,000 square feet, which equates to a maximum density of 4.4 dwelling units per acre. To project Vernonia's residential land needs, the following equation was used:

> (Net population increase/Average persons per dwelling unit) ÷ Dwelling units per acre by zone = Number of new acres needed by zone

Table 2 shows the resulting residential land needs under low, medium, and high density growth scenarios. The low density scenario assumes all available LDR land is consumed and the remaining demand is split evenly between R and GR Zones. The medium density scenario assumes residential land demand is distributed evenly between the three residential zones. The high density scenario assumes all residential land demand is supplied by the R and GR zones, and no LDR land is consumed.

TABLE 2
City of Vernonia 2031 Residential Land Needs

Zone	Density (du per acre)	Net Buildable acres[1]	Maximum # of units available	Low Density Scenario (net acres consumed)	Medium Density Scenario (net acres consumed)	High Density Scenario (net acres consumed)
R	8.7	130.5	1,137	4.2	5.8	8.8
GR	8.7	11.4	99	4.2	5.8	8.8
LDR	4.4	18.3	80	18.3	11.7	0
Total		**160.3**	**1,317**	**26.7**	**23.4**	**17.5**

[1] Source: Draft City of Vernonia Buildable Lands Inventory (2009)

Vernonia will require 17.5 – 26.7 net acres of buildable residential land to meet projected housing needs in 2031. Currently, Vernonia has a sufficient amount of buildable residential land to meet housing needs under any of these projected growth scenarios. For the remainder of this analysis, it is assumed that Vernonia will need 23.4 net acres of buildable residential land to meet housing demands in 2031 (the medium density growth scenario).

Type and Level of Employment Growth

Employment Needs Analysis

Employment needs were forecast to the year 2031 using employment information from the draft City of Vernonia Economic Opportunity Analysis (2009). According to this

report, commercial jobs are projected to grow at an average annual rate of 1.09 percent from 2008 to 2030 and industrial jobs are expected to grow at an average annual rate of 0.91 percent. These growth rates were applied respectively to the projected number of commercial and industrial jobs in 2030 to achieve estimates for 2031. As shown in Table 3, Vernonia is expected to add 127 new commercial jobs and 28 new industrial jobs by 2031.

TABLE 3
City of Vernonia Employment Forecast

	2008[1]	2030[1]	Projected 2031	Total New Jobs
Commercial Jobs (AAGR 1.09%)	449	570	576	127
Industrial Jobs (AAGR 0.91%)	123	150	151	28
Total	572	720	727	155

[1] Source: Draft City of Vernonia Economic Opportunity Analysis (2009)

Forecast 2031 Land Need for Job Growth

According to the draft City of Vernonia Economic Opportunity Analysis (2009), Vernonia's current commercial land density is about 33 jobs per acre and the current industrial land density is about 2.9 jobs per acre. At these densities, 3.9 acres of Downtown (DT) and General Commercial (GC) land would be needed to meet commercial land demand in 2031 and 9.8 acres of industrial land would be needed to meet industrial land demand.

TABLE 4
City of Vernonia 2031 Employment Land Needs

Zone	Density (jobs per acre)[1]	Buildable acres[2]	New jobs (2008-2031)	Land needed (acres)
GC & DT	33.0	1.4	127	3.9
LI	2.9	28.2	28	9.8
Total		**160.3**	**155**	**13.7**

[1] Source: Draft City of Vernonia Economic Opportunity Analysis (2009)
[2] Source: Draft City of Vernonia Buildable Lands Inventory (2009)

Future Land Supply

Forecast 2031 Land Supply

Table 5 shows that with no changes to current zoning, the current land supply is more than adequate to meet both residential and industrial land demands through 2031. However, the supply of buildable commercial land is not sufficient to meet the projected commercial land demand.

TABLE 5

2031 Forecast Buildable Lands – Existing Zoning

Zone	Current Buildable Land Supply (acres)[1]	2031 Land Demand (acres)	Unmet Demand (acres)	2031 Remaining Buildable Lands (acres)
R	130.5	5.8	0	124.7
GR	11.4	5.8	0	5.6
LDR	18.3	11.7	0	6.6
LI	28.2	9.8	0	18.4
PR	0	0	0	0
GC & DT	1.4	3.9	-2.5	0
TOTALS	**189.9**	**37.0**	**-2.5**	**155.3**

[1] Source: Draft City of Vernonia Buildable Lands Inventory (2009)

Vernonia has two zones that encourage commercial development: Downtown and General Commercial zones. Expanding available commercial lands would be one way for Vernonia to encourage local economic development and meet future commercial land needs.

Forecast 2031 Land Supply – Alternative Land Use Scenario

The City of Vernonia has developed an alternative land use scenario that reflects the City's desire to gain more commercial land outside the floodplain. To meet the projected employment demands and replace commercially zoned lands located in floodplain areas, the City is proposing to expand the Downtown Commercial Zone to include 6 acres of commercial land on the west side of Rose Avenue and 3 acres of commercial land between Jefferson and Weed Avenue. The 9 acres proposed for re-zoning are currently zoned for General Residential (GR). This means that under the alternative land use scenario, 9 acres of residential GR land would be re-zoned to commercial DT land.

Additionally, with 9 new acres of commercial land, the commercial job density would decrease from 33.0 to 19.4 jobs per acre. This means that the amount of commercial land needed to meet commercial land demand would increase to 6.6 acres under the alternative land use scenario.

Table 6 shows that under the alternative land use scenario, the buildable land supply would be more than adequate to meet residential, commercial, and industrial land demands through 2031. The 3.4 acres of unmet demand for General Residential (GR) land is due to the rezoning of 9 acres of GR land. However, this demand could be more than offset with the abundant supply of buildable Residential (R) land.

TABLE 6

2031 Forecast Buildable Lands – Alternative Land Use Scenario

Zone	Current Buildable Land Supply (acres)[1]	2031 Land Demand (acres)	Unmet Demand (acres)	2031 Remaining Buildable Lands (acres)
R	130.5	5.8	3.4	121.3
GR	2.4	5.8	-3.4	0.0
LDR	18.3	11.7	0.0	6.6
LI	28.2	9.8	0.0	18.4
PR	0.0	0	0.0	0.0
GC & DT	10.4	6.6	0.0	3.8
TOTALS	**189.9**	**39.7**	**0.0**	**150.2**

[1] Source: Draft City of Vernonia Buildable Lands Inventory (2009)

Future Transportation Conditions

Project Study Area

The project study area for the 2031 Future traffic analysis is based on the existing traffic analysis study area outlined in *Technical Memorandum 2: Existing Conditions and Needs, City of Vernonia Transportation System Plan Update (CH2M HILL, 2010).* The study area includes ten existing intersections within the City of Vernonia, eight of which are located along OR 47.

Forecasting Methodology

The year 2031 is the horizon analysis year for the future conditions traffic analysis, providing a 21-year forecast from existing conditions. Existing year (2010) 30th highest hour volumes were grown to reach future year (2031) land use scenario analysis volumes. Future volumes were reached using a Level 1 trending analysis and by adding the traffic generated from planned and programmed land use developments.

Based on ODOT Transportation System Planning Guidelines (2008), a Level 1 Trending Analysis is an appropriate methodology for forecasting future year volumes for areas where there is not enough data available to perform a cumulative (Level 2) analysis. This method typically projects future traffic volumes from historical growth trends of regional traffic volumes. These trends are usually determined from traffic volume data on the nearest state highway, since historical data are readily available. It is used mainly in rural or small urban areas where significant growth is not anticipated.

The existing traffic volumes were counted between April 2008 and March 2010 and were factored up to existing year (2010) traffic volumes. The traffic counts were also seasonally adjusted to the peak month for the study area and then balanced between local intersections. This volume represents the 30th worst hour of the year, and generally provides a target 'design hour' volume for future analysis. A growth rate was then applied to these existing turning movement volumes to develop a baseline 2031 traffic volume forecast.

Four different sources were compared to determine an annual geometric growth rate for the City of Vernonia. Table 7 shows the various data sources, the annual growth rate (geometric) and the growth factor. A brief description of each data source is provided below:

TABLE 7

Vernonia Transportation System Plan –2031 Growth Rate

Growth Rate Source	Annual Growth Rate	Growth Factor (2031/2010)
City of Vernonia – Portland State University Research Center – Medium Growth Forecast	0.58%	1.129
Columbia County – Portland State University Research Center – Medium Growth Forecast	0.92%	1.213
OR 47 Historical Growth 1999 – 2009 (ODOT)[1]	0.61%	1.135
OR 47 Future Volumes Table – 2029 (ODOT)[2]	1.41%	1.341

[1]PSU Population Research Center (2006)
[2] Data provided by Doug Baumgartner, ODOT Traffic, Region 1.
[3]http://www.oregon.gov/ODOT/TD/TPAU/A_Data.shtml

Population forecasts were analyzed for both Columbia County and the City of Vernonia based on research conducted by the Portland State University Population Research Center. The historical and medium growth forecasts are commonly used to forecast population and employment growth within a given community or county. Based on Table 18, the City of Vernonia population is expected to increase from 2,405 in 2010 to 2,700 in 2030, or at a 0.58 percent annual growth rate. Countywide, the annual growth rate is higher at 0.92 percent, corresponding to a population increase of 9,810 persons (58,505 persons in 2030, 48,695 persons in 2010). PSU population forecasts are provided in Attachment A.

Historical traffic volumes along OR 47 were provided from ODOT for the years from 1999 to 2009. Annual ADT traffic counts were collected at six different locations between milepost 61.27 and 62.79 for the 10-year period. Averaging data from all six locations, traffic volumes increased from approximately 5070 vehicles per day in 1999 to 5350 vehicles per day in 2009, representing an annual growth rate of 0.61 percent.

The ODOT Analysis Procedures Manual (APM) recommends using the ODOT Future Transportation Volume Table for developing future year traffic volumes (http://www.oregon.gov/ODOT/TD/TPAU/A_Data.shtml). This table projects average annual daily traffic volumes roughly 20 years in to the future for highways throughout the State of Oregon. Each forecasted volume is given an R-squared value, which measures the degree of correlation between historical traffic volumes and time. Forecasted volumes with an R-squared value greater than 0.75 represents a strong relationship, and can typically be used with a high degree of confidence. The APM also states forecasted volumes with an R-squared greater than 0.50 may be used if more reliable data are unavailable. Within the City of Vernonia Urban Growth Boundary, five locations were identified as having an R-squared greater than 0.50 and only one location, at milepost 61.25, has an R-squared value greater than 0.75. An investigation of these five locations showed on average, traffic volumes would increase from 4,160 ADT in

2009 to 5,500 ADT in 2029, representing an annual growth rate of 1.41 percent. Table 1 shows the growth rate calculation for this method.

TABLE 8
State Highway Annual Growth Rates

Milepost	2009 ADT	2029 ADT	R-squared Value	Overall Factor	1-year growth[1]
OR 47 – Nehalem Highway No. 102					
60.40	2000	2700	0.57	1.35	1.5%
61.25	3200	4400	0.76	1.38	1.6%
61.72	5100	6600	0.64	1.29	1.3%
62.11	6600	8500	0.59	1.29	1.3%
62.79	3900	5300	0.67	1.36	1.5%
Average	4160	5500	-	1.32	1.41%
				OR 47 Annual Rate	1.41%
				OR 47, 22-Year Factor	1.34

[1]Geometric Growth Rate
Source: ODOT 2029 Highway Future Volume Table
http://www.oregon.gov/ODOT/TD/TP/docs/TADR/2029FVT.pdf
ADT – Average Daily Traffic
The available growth rates are only projected to year 2029; this study assumed the traffic would grow at the same rate through year 2031.

Based on the data available and the information provided in Table 8, an annual growth rate of 0.61 percent was chosen as the most appropriate growth rate. This value was applied to existing year traffic volumes to obtain 2031 volumes. The 0.61 percent growth rate was selected because it is representative of both the historical growth observed along OR 47 between 1999 and 2009 and is approximately the same forecasted population growth rate for the City of Vernonia. It appears to represent both the local growth expected in the city and account for regional, through trip growth along OR 47. The countywide growth rate was not selected since it provides more of a regional growth forecast. The growth rate calculated using the Future Transportation Volume Table was dismissed due to the number of low R-squared values found in the data.

Trips generated by three planned development projects (pipeline projects) were also added to the forecasted 2031 traffic volumes. These three projects include:

- Nehalem View Subdivision
- Vernonia Schools Relocation Project
- West Oregon Electric Cooperative HQ and City development

Each of these transportation impact studies (TIS) provides a forecasted trip generation, trip distribution, and assignment for each development. The PM peak hour traffic volume assignment for each study was added to the Vernonia transportation network background volumes for the Year 2031. Although all pipeline projects are located within the city, trips from these studies had different distribution patterns and affected different study intersections. At study intersections where turning volumes were not provided by the previous studies, site specific traffic was distributed to the local

roadway network based on existing travel patterns. The Year 2031 Baseline forecasts the project trip assignment for the three pipeline projects and the final rounded and balanced Year 2031 PM peak hour forecasts are provided in Attachment B.

Future Planned Infrastructure Projects

The traffic analysis assumes that only one planned and programmed project will occur within the study area. As part of the Vernonia Schools Relocation Project, a 100-foot eastbound left-turn pocket is assumed to be constructed at the intersection of Bridge Street and Missouri Avenue. No additional transportation improvements within the study area have committed funding sources. A review of the ODOT Draft 2010-2013 Statewide Transportation Improvement Program indicates that no state projects are anticipated along OR 47 within the study area.

Future Year Traffic Analysis

Performance and Mobility Standards

For the 2031 future conditions, the mobility standards for intersections within ODOT's jurisdiction vary based on roadway classification. These standards vary based on facility type, if the facility is located inside an urban growth boundary, or if a specific highway has been designated as a special transportation area (STA). Within the City of Vernonia study area, mobility standards (maximum volume to capacity ratios) along the state highway vary between 0.80 and 0.95. For the intersections under the City of Vernonia jurisdiction, a LOS D standard was used. Table 9 shows the mobility standards for the intersection operational analysis.

Traffic Analysis Software Tools

A Synchro 7 computer traffic operations model was constructed for the 2031 Future analysis. The future year assumes existing lane geometry (since no future programmed improvements are planned) with 2031 forecasted turning movement volumes. The model assumes existing truck percentages, as that is the most accurate available data. Peak hour factors were updated per guidance from TPAU's Analysis Procedures Manual (APM) Section 5.3.3. Future year peak hour factors should be 0.95 for major arterials, 0.90 for minor arterials, and 0.85 for minor streets. Since OR 47 is classified as a Urban Collector/District Highway, and all other study facilities are either a Rural Major Collector or Local Roads, all intersection approaches were assumed to have a 0.85 peak hour factor, or operate with their existing peak hour factor if greater than 0.85.

SimTraffic, a traffic microsimulation software program, was used to collect vehicle queuing information for all intersections. Queue results are reported as a 95th percentile expected queue length, which means that 95 percent of the time during the peak hour analyzed, the queue length should be less than or equal to the value reported. Five separate model runs of SimTraffic were averaged to obtain queuing results.

Operational Analysis Results

This section updates the Future Transportation Demand section of the 1999 TSP. The volume to capacity ratios and 95th percentile queue lengths were collected from the future Synchro and SimTraffic simulation models for the ten study area intersections.

These results indicate that the future traffic growth assumed will not lead to significant operational problems within Vernonia.

Table 9 also provides a summary of the Year 2031 LOS conditions for the ten study intersections during the PM peak hour. In the existing conditions analysis, all of the intersections meet mobility standards. Even with the growth of traffic in the city, all intersections are expected to operate at an acceptable mobility standard in the Year 2031. Detailed Synchro mobility reports are also reported in Attachment C.

TABLE 9

Vernonia Transportation System Plan – Intersection Operational Results

ID	Intersection	Control Type	Mobility Standard[2]		Year 2031 Operations	
			Uncontrolled Approach	Controlled Approach	Uncontrolled Approach	Controlled Approach
1	State Avenue/Stoney Point Road	TWSC	LOS D		LOS A (9.8 sec/veh) Worst Movement= EBL/T/R	
2	Rose Avenue/Bridge Street[1]	AWSC	0.95		0.38	
3	Bridge Street/Weed Avenue	TWSC	0.95	0.95	0.04	0.31
4	Bridge Street/State Avenue	TWSC	0.80	0.80	0.22	0.20
5	Bridge Street/Texas Avenue	TWSC	0.80	0.80	0.03	0.06
6	Bridge Street/Missouri Avenue	TWSC	0.80	0.80	0.17	0.18
7	Bridge Street/Riverside Drive	TWSC	0.80	0.80	0.03	0.06
8	Rose Avenue/Maple Street	TWSC	0.80	0.80	0.00	0.12
9	Maple Street/Weed Avenue	AWSC	LOS D		LOS A (7.5 sec/veh)	
10	Rose Avenue/Cougar Street	TWSC	0.80	0.80	0.02	0.15

[1]The intersection of Bridge Street/Rose Avenue has a free NBR movement. The westbound approach is yield controlled.
[2]Future Mobility Source: ODOT Highway Design Manual (Table 10-1).
AWSC: All-Way Stop Controlled
TWSC: Two-Way Stop Controlled
V/C ratios for All-Way Stop Controlled intersections are for the whole intersection.
Year 2031 Operations as reported from Synchro 7.

The vehicle queuing analysis identifies deficient vehicle storage locations and provides key information as the project advances into the alternative development stage. Table 10 shows the forecasted 2031 PM peak hour 95th percentile vehicle queues lengths at the 10 study intersections. One movement, the northbound right turn at Rose Street/Bridge Street, is expected to have a 95th percentile queue that exceeds existing storage capacity. The current right turn pocket can store approximately three vehicles. With the anticipated growth, the right turn queue is likely to spill back out of the existing right turn pocket. The full SimTraffic queuing results are provided in Attachment C.

TABLE 10

Vernonia TSP – Year 2031 Baseline Conditions 95th Percentile Queues

ID	Intersection	Method	Approach	Lane Group	Existing Storage (feet)	Queue Length (feet)
1	State Avenue/ Stoney Point Road	95% Queue SimTraffic	Eastbound	Left/Thru/Right	-	20[1]
			Westbound	Left/Thru/Right	740	20
2	Rose Avenue/ Bridge Street	95% Queue SimTraffic	Eastbound	Left/Thru/Right	280	50
			Westbound	Left/Thru/Right	260	70
			Northbound	Left/Thru	280	60
				Right	75	80
			Southbound	Left/Thru/Right	300	60
3	Bridge Street/ Weed Avenue	95% Queue SimTraffic	Southbound	Left/Thru/Right	-	80
4	Bridge Street/ State Avenue	95% Queue SimTraffic	Southbound	Left/ Right	240	70
5	Bridge Street/ Texas Avenue	95% Queue SimTraffic	Northbound	Left/Thru/Right	Driveway	n/a
			Southbound	Left/Thru/Right	150	40
6	Bridge Street/ Missouri Avenue	95% Queue SimTraffic	Northbound	Left/Thru/Right	850	20
			Southbound	Left/Thru/Right	120	90
7	Bridge Street/ Riverside Drive	95% Queue SimTraffic	Northbound	Left/Thru/Right	170	n/a
			Southbound	Left/Thru/Right	170	40
8	Rose Avenue/ Maple Street	95% Queue SimTraffic	Eastbound	Left/Thru/Right	260	20
			Westbound	Left/Thru/Right	290	70
9	Maple Street/ Weed Avenue	95% Queue SimTraffic	Eastbound	Thru/Right	290	60
			Westbound	Left/Thru	290	50
			Northbound	Left/ Right	270	60
			Southbound	Left/Thru/Right	280	60
10	Rose Avenue/ Cougar Street	95% Queue SimTraffic	Eastbound	Left/Thru/Right	270	50
			Westbound	Left/Thru/Right	driveway	60

Notes:
[1]Queue lengths less than 20 feet are rounded up to the 20 feet to represent a standard vehicle length.
95th Percentile queues calculated using an average of five, one hour SimTraffic runs.
Queues lengths not reported for free-flowing and uncontrolled movements.
Queue lengths rounded to the nearest 10 feet
Numbers in black highlight indicate a vehicle queues length that exceeds the available storage length.

Turn-Lane Warrants

A turn lane warrant analysis was completed to check if turn lanes meet the installation criteria outlines in the Highway Design Manual. Turns lanes improve safety and the capacity of the roadway by reducing the speed differential between through and turning vehicles. Meeting a turn lane criteria does not necessarily require installation. The APM outlines three criteria if a turn lane should be installed including:

- Traffic volumes
- Crash experience
- Special cases

Turn-lane warrants were completed at all study intersection based on the 2031 PM peak hour traffic volumes. The other two criteria were not analyzed. Tables 11 and 12 have been prepared showing the threshold volumes for meeting turning left and right turn-lane warrants, respectively. This analysis was performed in accordance with Chapter 7 of the APM, utilizing Exhibit 7-1 for identifying left turn-lane warrants and Exhibit 7-2 for right turn-lane warrants.

TABLE 11
Vernonia TSP – Year 2031 Left Turn Lane Warrants

Intersection	Movement	Estimated 2031 PM Peak Hour Volume	Opposing/Advancing Volumes[1]	Turn Lane Warrant Threshold	Is Warrant Met?
Rose Avenue/ Bridge Street	WBL	195	320	50	Yes
	NBL	25	355	44	No
	SBL	45	355	44	Yes
Bridge Street/ Weed Avenue	WBL	50	680	17	Yes
	EBL	30	660	17	Yes
Bridge Street/ State Avenue	EBL	85	755	17	Yes
Bridge Street/ Texas Avenue	EBL	35	625	20	Yes
Bridge Street/ Riverside Drive	EBL	35	475	31	Yes
Rose Avenue/ Maple Street	NBL	3	568	22	No
	SBL	5	570	22	No
Rose Avenue/ Cougar Street	NBL	4	534	25	No
	SBL	25	555	22	Yes

[1]Only movements having opposing/advancing volumes greater than 200 vehicles per hour were analyzed.
Numbers in black highlight indicates a warrant is met for a left-turn pocket.
Left turn lane warrants based on Exhibit 7-1 from the *ODOT Analysis Procedure Manual (APM).*

As shown in Table 11, several eastbound and westbound left lanes along Bridge Street are warranted. Eastbound left turn lanes are warranted along all study intersections along Bridge Street and westbound left turn lanes are warranted at the intersections of Bridge Street/Rose Avenue and Bridge Street/Weed Avenue. Furthermore, left turn lanes are warranted along Rose Avenue at a few study intersections.

Table 12 shows that no study intersections will warrant a right-turn lane based on 2031 PM peak hour traffic volumes.

TABLE 12

Vernonia TSP – Year 2031 Right Turn-Lane Warrants

Intersection	Movement	Estimated 2031 PM Peak Hour Volume	Approaching Volume	Turn Lane Warrant Threshold	Is Warrant Met?
Rose Avenue/ Bridge Street	SBR	0	65	105	no
	EBR	10	42	115	no
	WBR	35	280	80	no
Bridge Street/ Weed Avenue	SBR	10	73	105	no
	EBR	5	340	75	no
	WBR	50	370	65	no
Bridge Street/ State Avenue	SBR	70	85	105	no
	WBR	30	315	75	no
Bridge Street/ Texas Avenue	SBR	30	33	115	no
	WBR	5	270	80	no
Bridge Street/ Missouri Avenue	SBR	55	80	105	no
	EBR	15	320	75	no
	WBR	25	235	85	no
Bridge Street/ Riverside Drive	SBR	20	30	115	no
	WBR	15	210	85	no
Rose Avenue/ Maple Street	NBR	45	348	75	no
	SBR	15	225	85	no
	EBR	2	7	115	no
	WBR	35	73	105	no
Maple Street/ Weed Avenue	NBR	10	13	115	no
	SBR	15	55	105	no
	EBR	2	52	105	no
Rose Avenue/ Cougar Street	NBR	20	319	75	no
	SBR	20	240	85	no
	EBR	3	23	115	no
	WBR	30	60	105	no

Numbers in black highlight indicates a warrant is met for a right-turn pocket.
Right turn-lane warrants based on Exhibit 7-2 from the *ODOT Analysis Procedure Manual (APM).*

Future System Deficiencies

Based on the analysis of existing and future transportation conditions, and recommendations from traffic impact analyses, the following needs have been identified for the future.

Missing Links

This section updates the Connectivity section of the 1999 TSP. OR 47 will carry much of the east-west traffic through the city by the year 2031 due to the lack of east-west connectivity through the city. Improving the connectivity and completing parts of the grid network around downtown Vernonia will provide some relief along OR 47. However, topographical constraints through the city provide a challenge. A few missing links are identified below that could improve east-west connectivity through the city:

- A two-way connection between Rose Avenue and Weed Avenue along Cougar Street.
- 1st Avenue between Bridge and Cougar Streets
- Columbia Street between 3rd Avenue and Weed Avenue
- Nehalem Street connection to Weed Avenue
- Cougar Street between Jefferson Avenue and Adams Avenue
- North-south road parallel to OR 47 on east side where OR 47 is Mist Drive
- Bridges (as called out in the 1999 TSP)

Geometric Deficiencies

- The intersection of Rose Avenue and Bridge Street will likely have northbound right turn queue that exceeds available storage in the future conditions.
- The flashing beacon at Rose Avenue/Bridge Street is confusing for visitors.
- There is a potential safety conflict at the offset intersection of Weed Avenue and Bridge Street.

Safety Issues

No safety needs were identified.

Summary of Future Conditions and Needs

Land Use

- With current zoning, the City of Vernonia's buildable land supply will be more than adequate to meet both residential and industrial land needs through 2031. However, the supply of buildable commercial land is not sufficient to meet the projected commercial land demand.
- The alternative land use scenario would add 9 acres of commercial land to the Downtown (DT) commercial district. Under this scenario, the buildable land supply

within Vernonia would be more than adequate to meet residential, commercial, and industrial land needs through 2031.

Traffic and Transportation

- All study intersections are anticipated to operate at an acceptable mobility standard in the Year 2031 PM peak hour.
- One study area intersection, Bridge Street/Rose Avenue, will experience vehicle queuing on the northbound right turn.
- Several left turn lane warrants were met for eastbound and westbound left turn movements along Bridge Street. No right turn lane warrants were met at any study intersections for the PM peak hour.
- There is little east-west connectively through the city
- The intersection of Rose Avenue/Bridge Street can be confusing for visitors.

Next Steps

The existing conditions and deficiencies will be reviewed by the Project Advisory Committee (PAC) and the Project Management Team (PMT) and relevant information will be added. These future conditions and deficiencies will help inform recommended suggested transportation improvements.

NOTICE:

This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed, in part, by Federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), local government, and the State of Oregon funds.

The contents of this document do not necessarily reflect views or policies of the State of Oregon.

Attachment A

Censuses and more recent population estimates and housing data, and where available, detailed information about historic and planned future residential development. Forecasts were not constrained by either current city boundaries or residential building capacities. Adjustments to 1990 and 2000 census counts for Clatskanie and 2000 census counts for Vernonia were based on surveys and censuses conducted by the PSU Population Research Center in 1991 and 2006. The housing unit model was not used to forecast the population of the City of Prescott; its population remains at its 2008 level throughout the forecast period.

TABLE 18:

Historical & Medium Growth Forecast: Total Population
Columbia County Cities & Unincorporated Area

	Clatskanie	Columbia City	Prescott	Rainier	St. Helens	Scappoose	Vernonia	Unincorp.	County-wide
1990: Total Population	1,708	1,003	63	1,674	7,535	3,529	1,808	20,237	37,557
2000:									
Total Population	1,675	1,571	72	1,687	10,019	4,976	2,292	21,268	43,560
Numeric change	*-33*	*568*	*9*	*13*	*2,484*	*1,447*	*484*	*1,031*	*6,003*
Average Annual Growth Rate	*-0.2%*	*4.6%*	*1.3%*	*0.1%*	*2.9%*	*3.5%*	*2.4%*	*0.5%*	*1.5%*
2010:									
Total Population	1,795	1,979	75	1,844	12,847	6,601	2,405	21,149	48,695
Numeric change	*120*	*408*	*3*	*157*	*2,828*	*1,625*	*113*	*-119*	*5,135*
Average Annual Growth Rate	*0.7%*	*2.3%*	*0.4%*	*0.9%*	*2.5%*	*2.8%*	*0.5%*	*-0.1%*	*1.1%*
2020:									
Total Population	1,948	2,292	75	2,060	15,591	8,234	2,605	21,220	54,025
Numeric change	*153*	*313*	*0*	*216*	*2,744*	*1,633*	*200*	*71*	*5,330*
Average Annual Growth Rate	*0.8%*	*1.4%*	*0.0%*	*1.1%*	*1.9%*	*2.2%*	*0.8%*	*0.0%*	*1.0%*
2030:									
Total Population	2,058	2,532	75	2,210	17,842	10,022	2,700	21,066	58,505
Numeric change	*110*	*240*	*0*	*150*	*2,251*	*1,788*	*95*	*-154*	*4,480*
Average Annual Growth Rate	*0.5%*	*1.0%*	*0.0%*	*0.7%*	*1.3%*	*1.9%*	*0.4%*	*-0.1%*	*0.8%*

DRAFT

Medium Growth Forecast adopted by Cities + County
9/09

City of Vernonia TSP Update

Population	2340	
ADT	4000	
2-lane	District Highway	
Weekday	Rural Populated	
ATR Range	3600	4400
Highway 102	MP 62.5	

NO ONSITE OR NEARBY ATR!

Note: Table was modifed to include 2009 Seasonal Trends for ATR Station 03-013 and seasonal adjustment interpolation calculations.
-JDJ

1. Similar ATR Method

			Trend	Area	Facility		Classifica	ADT	Designation		Population			
BEST METHOD	-2.50%	**ATR 03-013**	*Aggricultural*	*Rural*	2 lane	Weekday	District Hi	3900	OR 213 Cascade					
Marquam			31	28	31	30	31	30	31	31	30	31	30	31
03-013	Peak Month	Peak%	January	February	March	April	May	June	July	August	September	October	November	December
2009	August	109	93	94	96	102	105	105	106	109	108	103	98	91
2008	July	114	91	100	102	104	110	109	114	106	103	100	105	84
2007	June	112	84	96	101	103	107	109	110	112	109	102	100	89
2006	August	113	89	92	94	103	105	109	111	113	111	106	98	92
2005	August	111	92	95	97	101	105	109	110	111	107	103	102	94
	Average	112	91	95	98	103	106	109	110	111	108	103	100	91
	Factor		**1.2353**	**1.1789**	**1.1429**	**1.0909**	**1.0599**	**1.0275**	**1.0151**	**1.0120**	**1.0370**	**1.0909**	**1.1200**	**1.2353**

Seasonal Adjustment Interpolation

Month	Date	Days Ahead	Days Back	Month Ahead	Month Back	Seasonal Adj Factor
December	2	13	17	1.2353	1.1200	1.185
March	10	5	23	1.1429	1.1789	1.149
April	24	21	9	1.0599	1.0909	1.082

2. Seasonal Trend Table

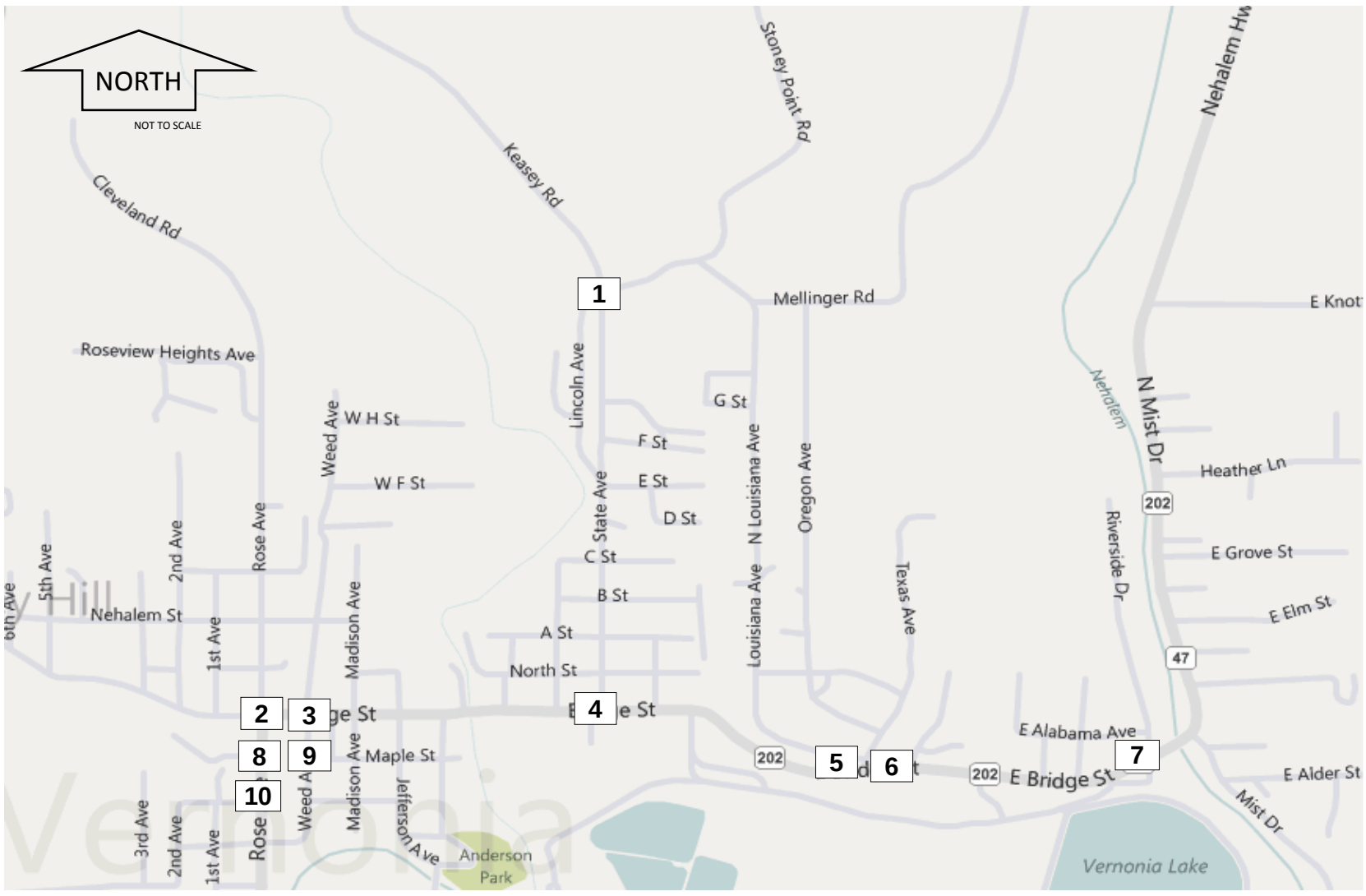
			January	**February**	**March**	**April**	**May**	**June**	**July**	**August**	**September**	**October**	**November**	**December**	**Peak**
AGRICULTURE			**1.1881**	**1.0732**	**1.0221**	**0.9854**	**0.9446**	**0.9240**	**0.8917**	**0.8940**	**0.9054**	**0.9336**	**0.9865**	**1.1632**	**0.8821**
Factor			**1.3469**	**1.2166**	**1.1587**	**1.1171**	**1.0709**	**1.0475**	**1.0109**	**1.0134**	**1.0264**	**1.0583**	**1.1184**	**1.3186**	

Yearly Growth Adjustment Factor

MP	**Location**	**2009 ADT**	**2008 ADT**	**2007 ADT**	**2006 AD**	**2005 ADT**	**2004 AD**	**2003 ADT**	**2002 ADT**	**2001 ADT**	**2000 ADT**	**1999 ADT**		Growth **2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**Avg**	
61.72	0.01 mile wes	5100	4000	4200	4200	3900	4000	4000	5300	5100	4900	4600		1.0652	1.0408	0.9623	0.7547	1.0000	0.9750	1.0769	1.0000	0.9524	1.2750	1.0102	
62.11	0.02 mile wes	6600	4800	5100	5000	4900	5000	5000	6500	6400	6300	5900		1.0678	1.0159	0.9846	0.7692	1.0000	0.9800	1.0204	1.0200	0.9412	1.3750	1.0174	
62.27	Rock Creek E	7200	5200	5400	5400	5300	5400	5400	6900	6800	6700	6700		1.0000	1.0149	0.9855	0.7826	1.0000	0.9815	1.0189	1.0000	0.9630	1.3846	1.0131	
62.52	0.02 mile eas	5200	3600	3800	3700	4200	4300	4300	5500	5400	5300	5200		1.0192	1.0189	0.9818	0.7818	1.0000	0.9767	0.8810	1.0270	0.9474	1.4444	1.0078	
62.56	0.02 mile sou	4100	3200	3400	3300	3600	3700	3700	4600	4500	4400	4200		1.0476	1.0227	0.9783	0.8043	1.0000	0.9730	0.9167	1.0303	0.9412	1.2813	0.9995	
62.79	0.02 mile sou	3900	3100	3300	3300	3300	3400	3400	4100	4000	3900	3800		1.0263	1.0256	0.9756	0.8293	1.0000	0.9706	1.0000	1.0000	0.9394	1.2581	1.0025	
	AVG	5350	3983	4200	4150	4200	4300	4300	5483	5367	5250	5067												1.008	Average

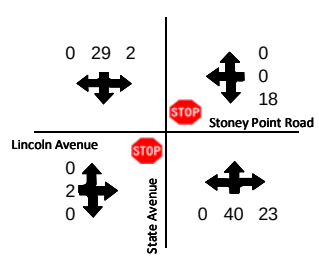
ANNUAL GROWTH

Attachment B



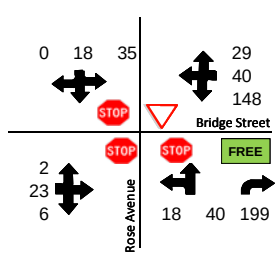
1 Stoney Point Road/State Avenue

Growth Rate: 0.61%
Growth Factor: 1.135



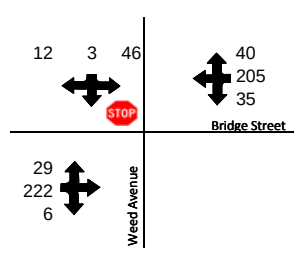
2 Bridge Street/Rose Avenue

Growth Rate: 0.61%
Growth Factor: 1.135



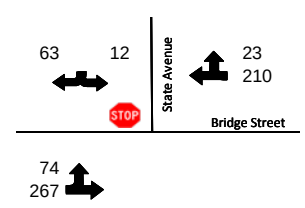
3 Bridge Street/Weed Avenue

Growth Rate: 0.61%
Growth Factor: 1.135



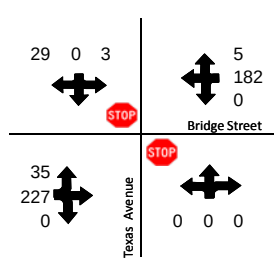
4 Bridge Street/State Avenue

Growth Rate: 0.61%
Growth Factor: 1.135



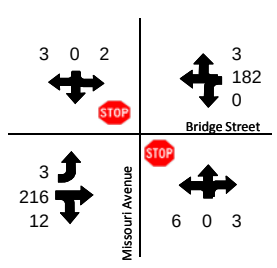
5 Bridge Street/Texas Avenue

Growth Rate: 0.61%
Growth Factor: 1.135



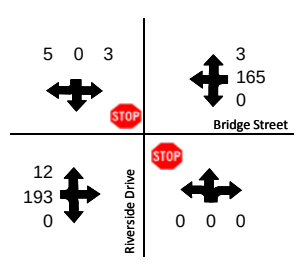
6 Bridge Street/Missouri Avenue

Growth Rate: 0.61%
Growth Factor: 1.135



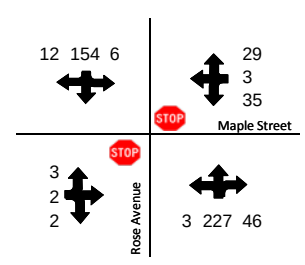
7 Bridge Street/Riverside Drive

Growth Rate: 0.61%
Growth Factor: 1.135



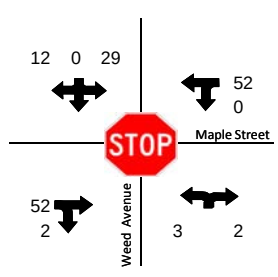
8 Maple Street/Rose Avenue

Growth Rate: 0.61%
Growth Factor: 1.135



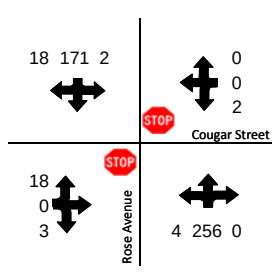
9 Maple Street/Weed Avenue

Growth Rate: 0.61%
Growth Factor: 1.135



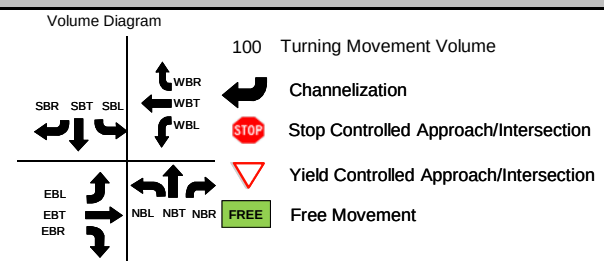
10 Cougar Street/Rose Street

Growth Rate: 0.61%
Growth Factor: 1.135



Legend:

Volume Diagram



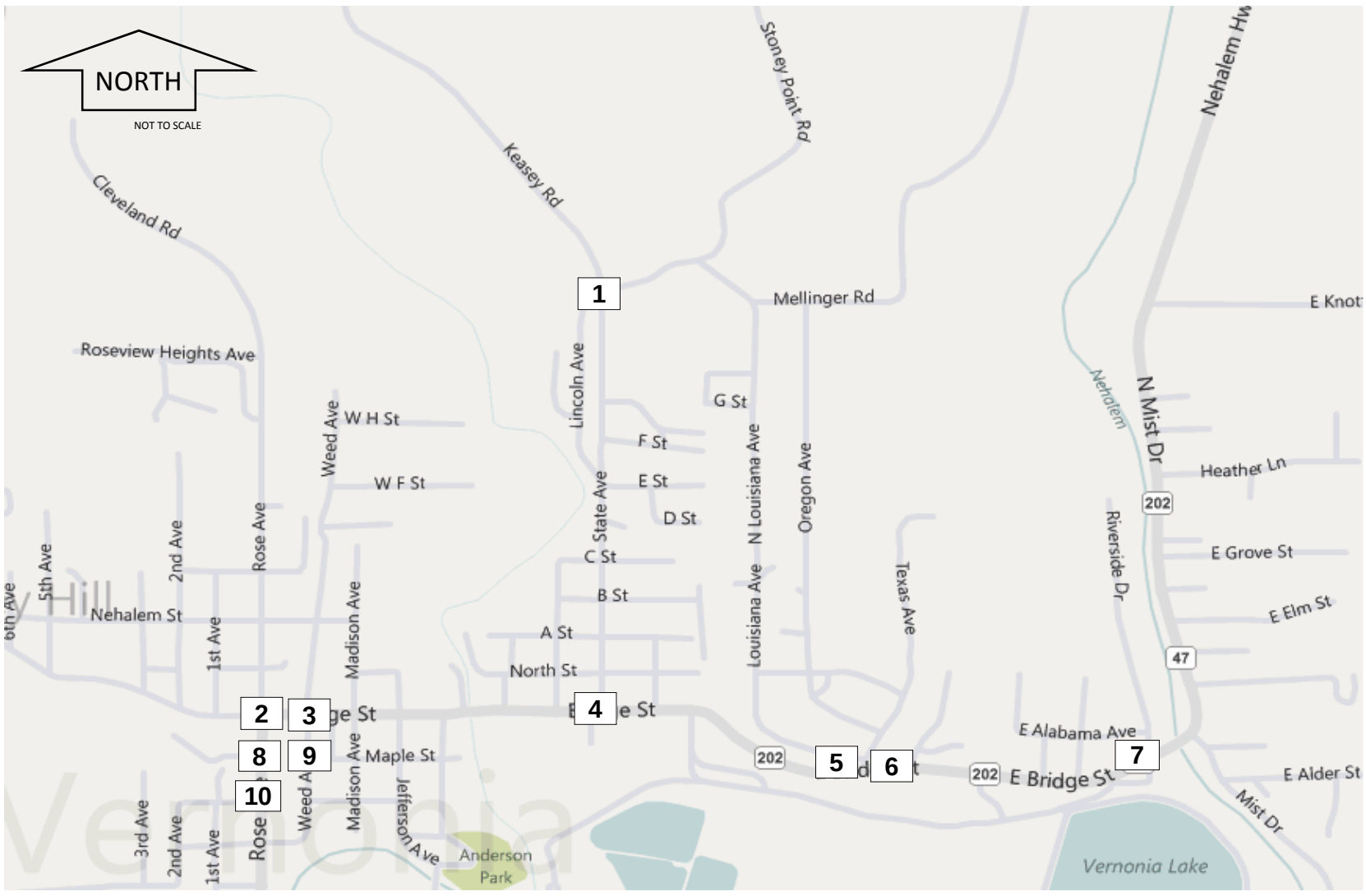
Notes:

1. Map Source: www.bing.com/maps
2. System peak hour occurred between 4:00 PM to 5:00 PM.
3. Mobility Standards are based on the Oregon Highway Plan or City of Vernonia LOS Standards.
4. Synchro software version 7 used for analysis.
5. VC = Volume to Capacity Ratio
6. V/C Ratio Std = Intersection Mobility Standard (per ODOT)

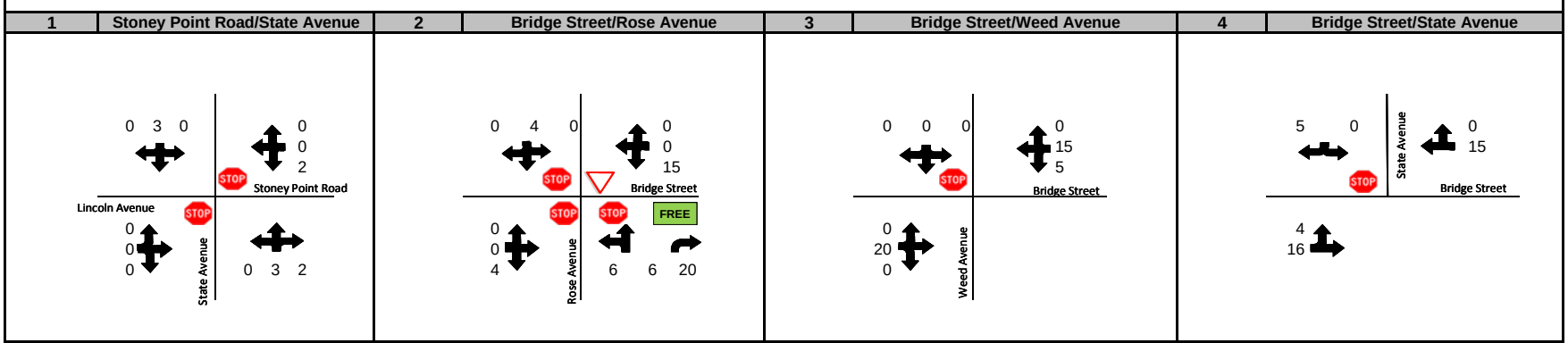
*** City of Vernonia has a LOS D mobility standard. LOS (avg delay/veh) is reported for the worst operating movement (for TWSC) and total intersection (for AWSC).

2031 Baseline PM Peak Hour Future Conditions: Unbalanced and Unrounded Traffic Volumes

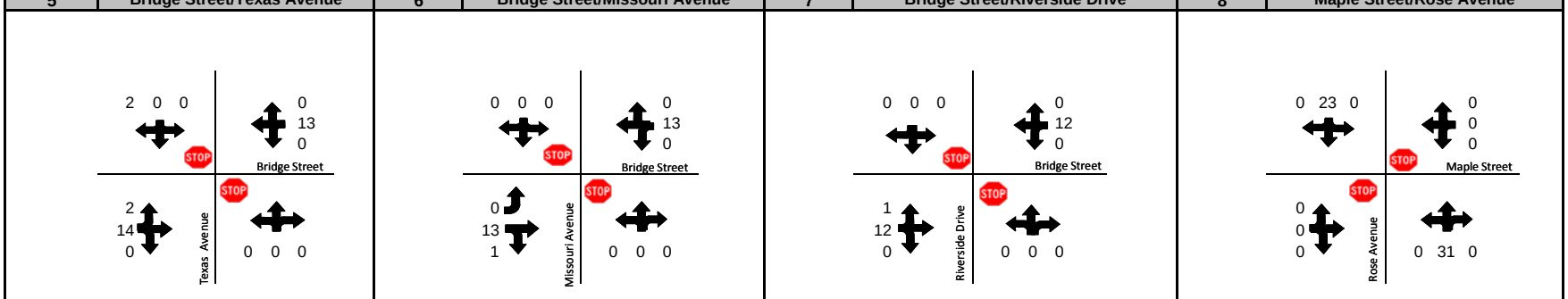
Vernonia Transportation System Plan



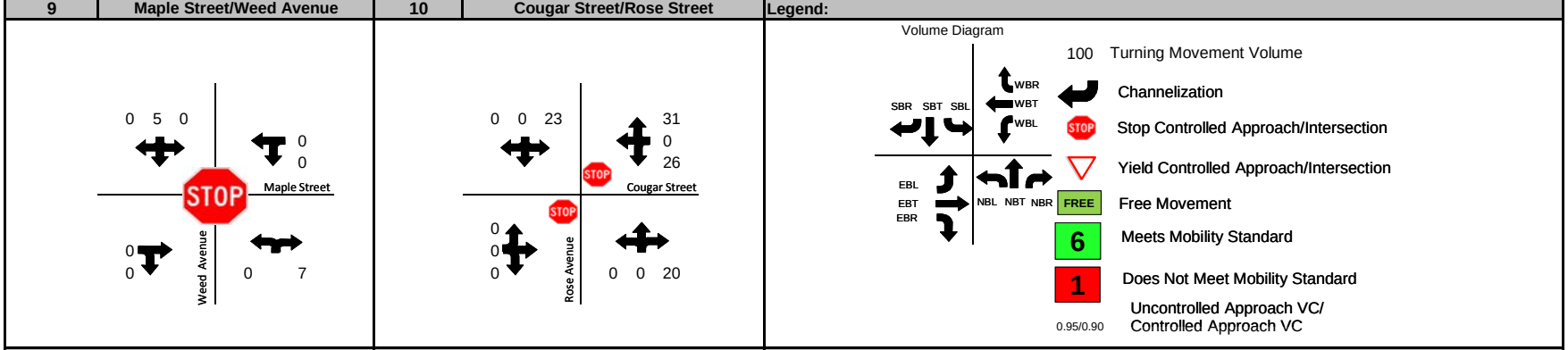
1	Stoney Point Road/State Avenue	2	Bridge Street/Rose Avenue	3	Bridge Street/Weed Avenue	4	Bridge Street/State Avenue



5	Bridge Street/Texas Avenue	6	Bridge Street/Missouri Avenue	7	Bridge Street/Riverside Drive	8	Maple Street/Rose Avenue



9	Maple Street/Weed Avenue	10	Cougar Street/Rose Street	Legend:

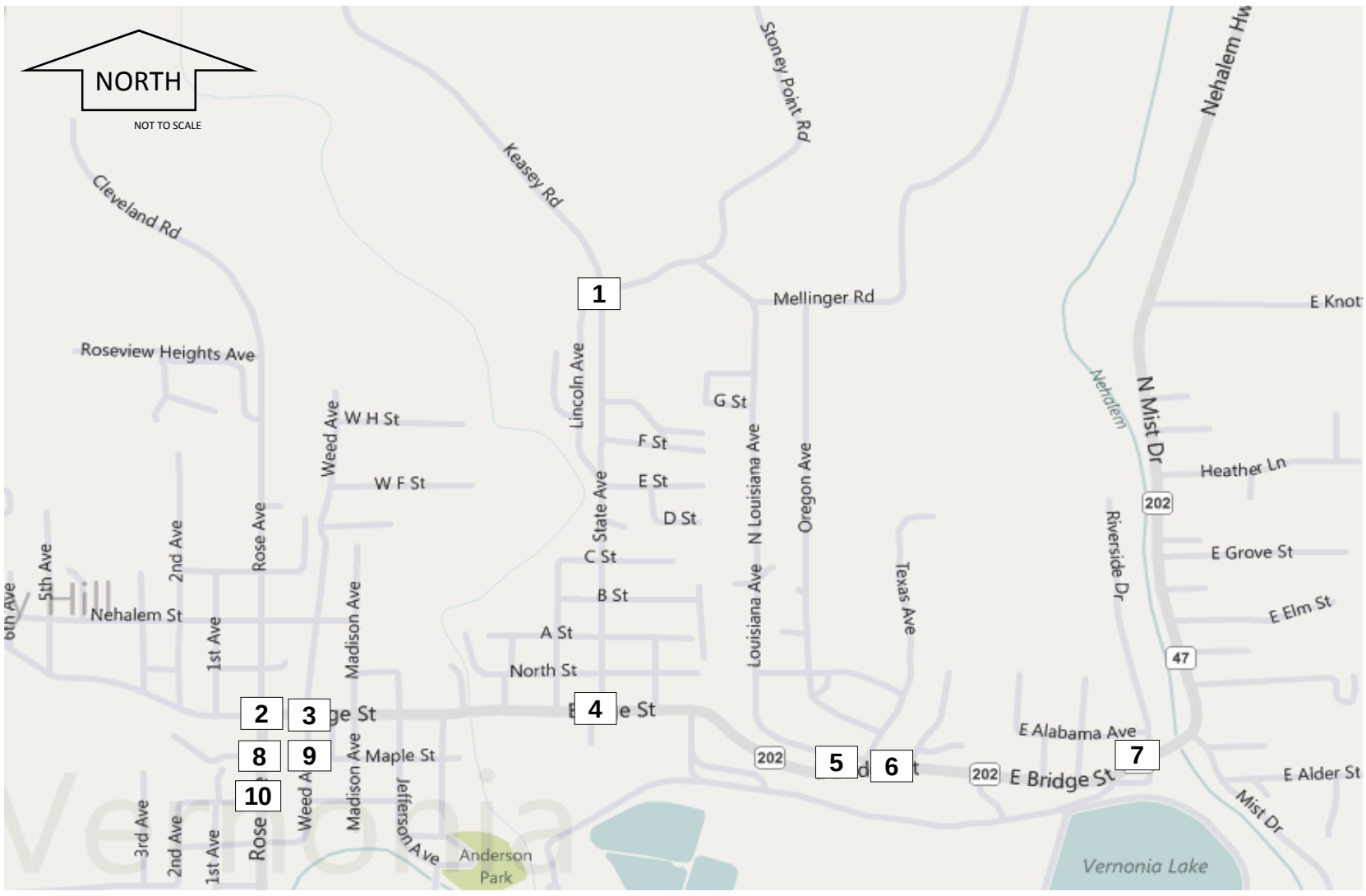


Notes:

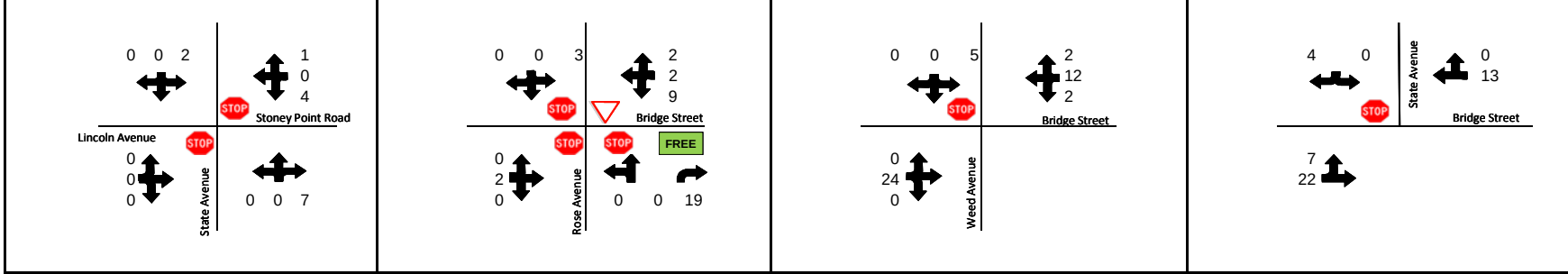
1. Map Source: www.bing.com/maps
2. System peak hour occurred between 4:00 PM to 5:00 PM.
3. Source: West Oregon Electric Cooperative, Inc. HQ Facility TIA (DEA May 2010)

2031 PM Peak Hour WOEC Site Traffic Volume Distribution and Assignment

Vernonia Transportation System Plan

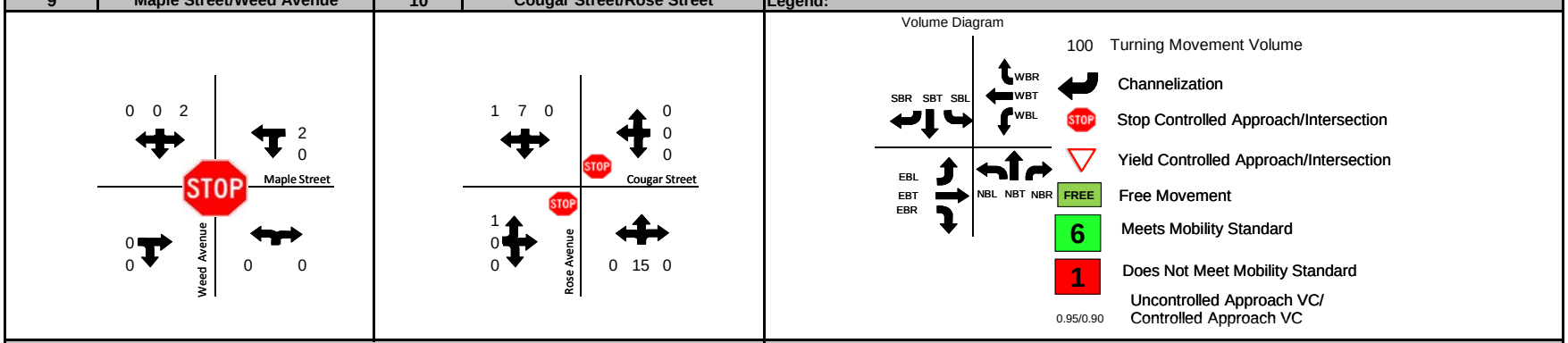


1	Stoney Point Road/State Avenue	2	Bridge Street/Rose Avenue	3	Bridge Street/Weed Avenue	4	Bridge Street/State Avenue



5	Bridge Street/Texas Avenue	6	Bridge Street/Missouri Avenue	7	Bridge Street/Riverside Drive	8	Maple Street/Rose Avenue

9	Maple Street/Weed Avenue	10	Cougar Street/Rose Street	Legend:

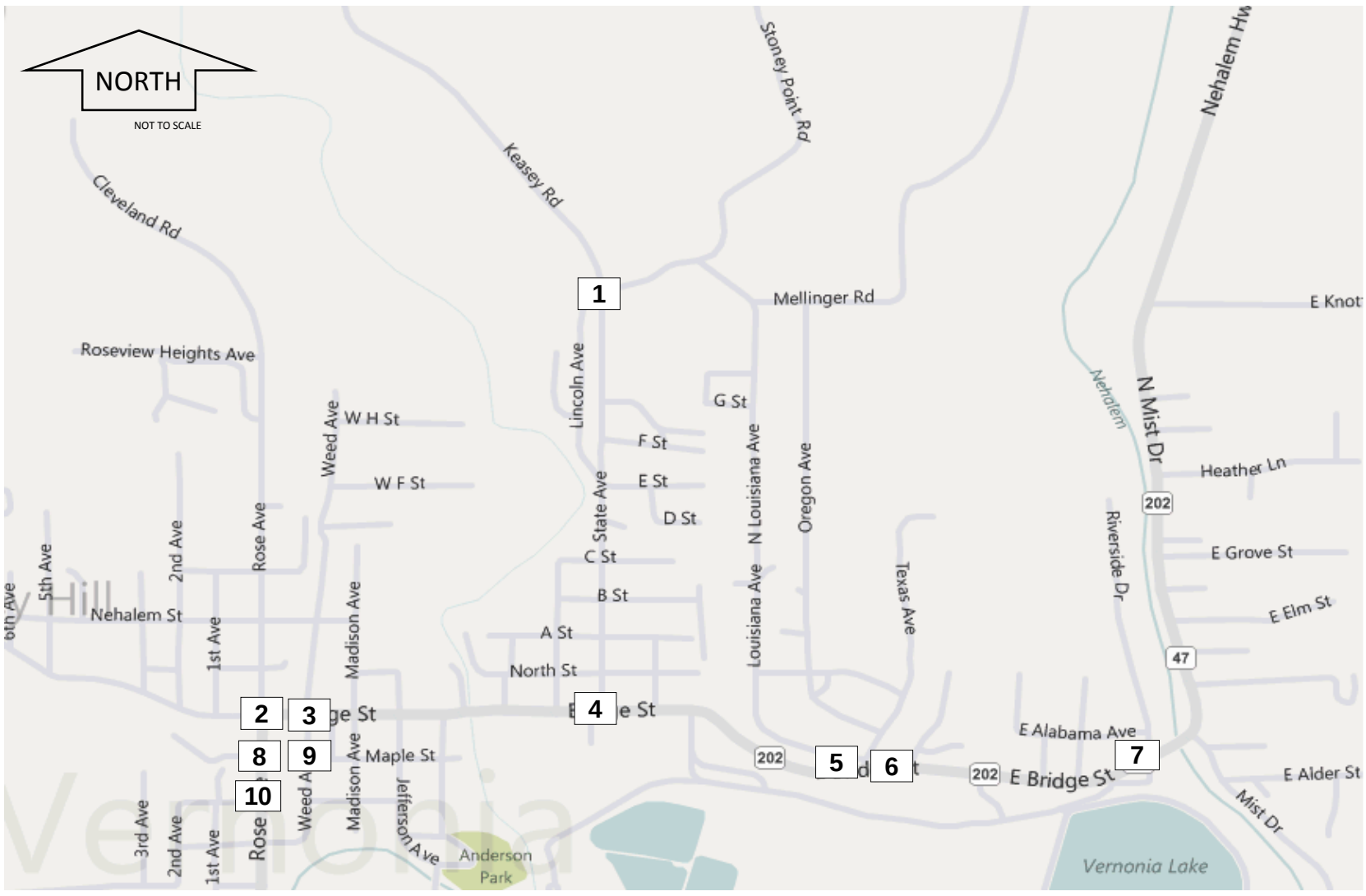


Notes:

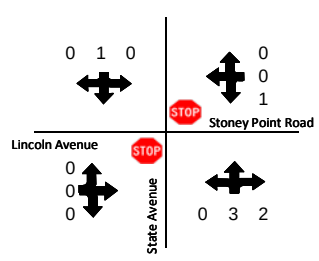
1. Map Source: www.bing.com/maps
2. System peak hour occurred between 4:00 PM to 5:00 PM.
3. Source: Nehalem View Subdivision Traffic Impact Study (Lancaster Engineering, May 2008)

2031 PM Peak Hour Nehalem View Site Traffic Volume Distribution and Assignment

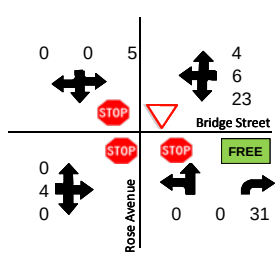
Vernonia Transportation System Plan



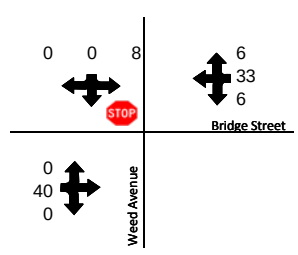
1 Stoney Point Road/State Avenue



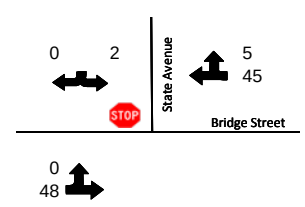
2 Bridge Street/Rose Avenue



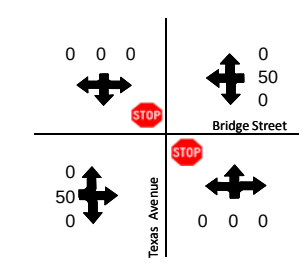
3 Bridge Street/Weed Avenue



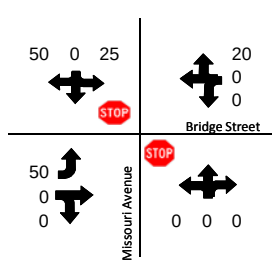
4 Bridge Street/State Avenue



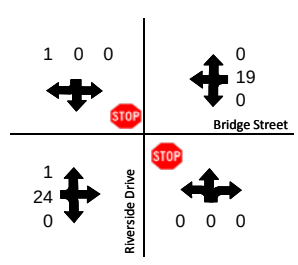
5 Bridge Street/Texas Avenue



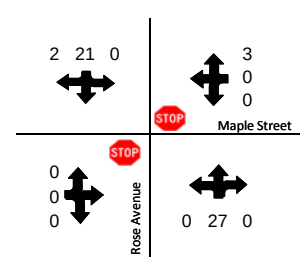
6 Bridge Street/Missouri Avenue



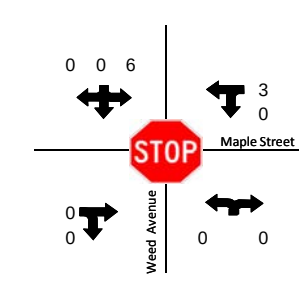
7 Bridge Street/Riverside Drive



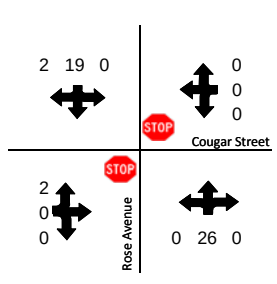
8 Maple Street/Rose Avenue



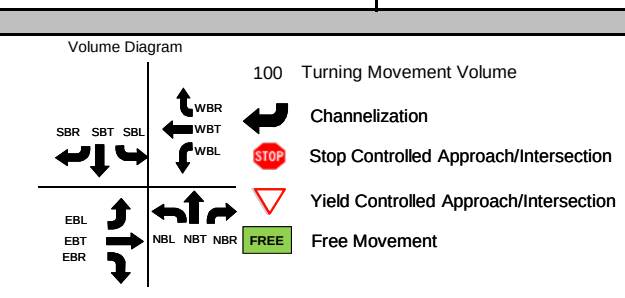
9 Maple Street/Weed Avenue



10 Cougar Street/Rose Street



Legend:

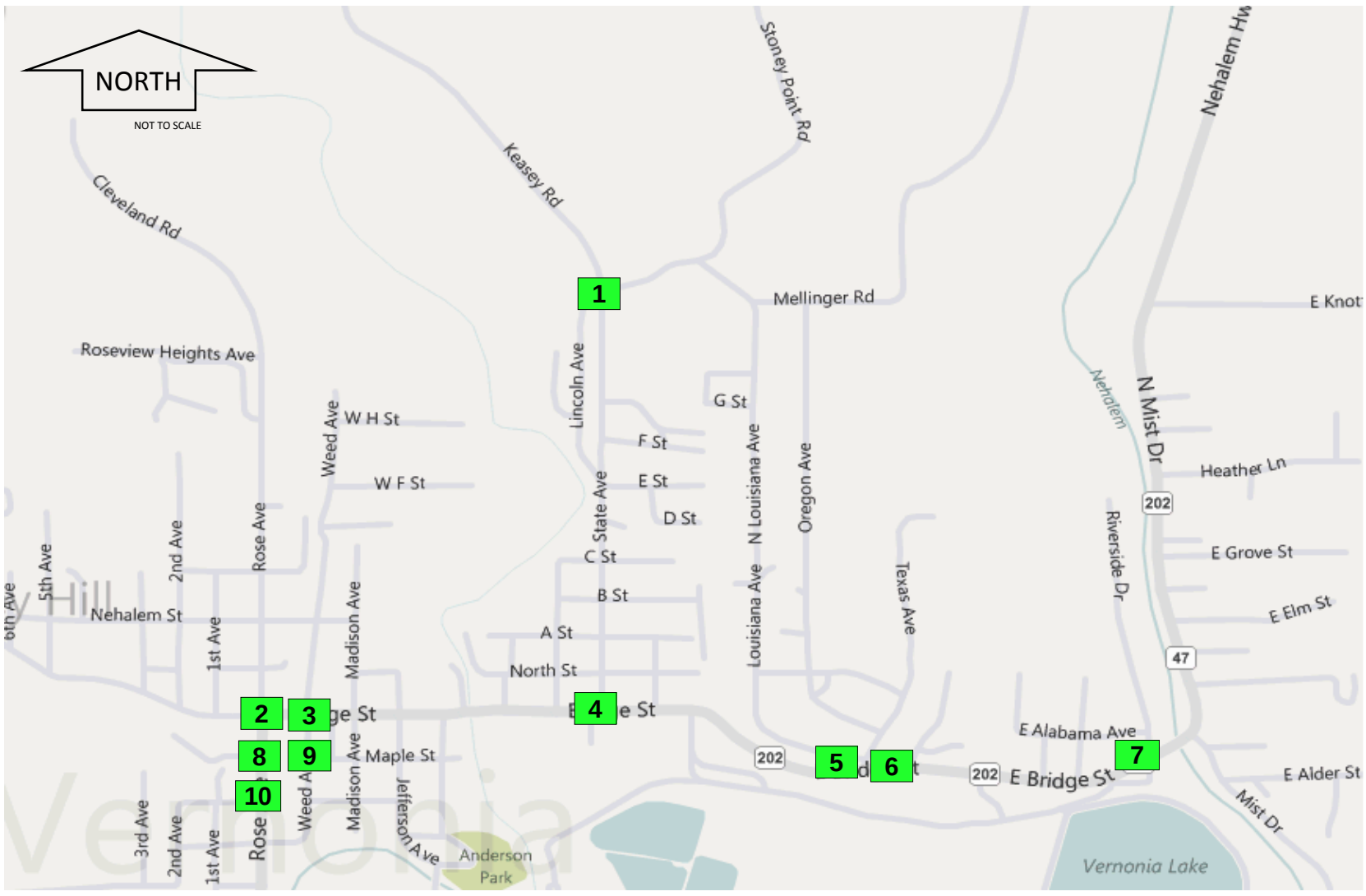


Notes:

1. Map Source: www.bing.com/maps
2. System peak hour occurred between 4:00 PM to 5:00 PM.
3. Source: Vernonia School Relocation Project Transportation Impact Analysis (KAI, March 2010)

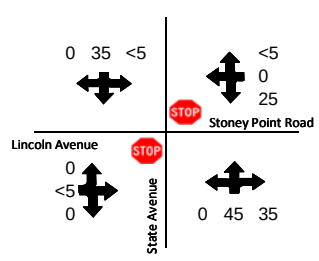
2031 PM Peak Hour Vernonia School Relocation Site Traffic Volume Distribution and Assignment

Vernonia Transportation System Plan



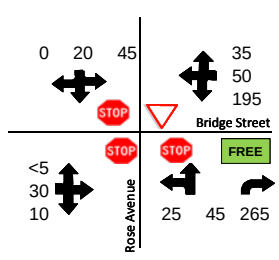
1 Stoney Point Road/State Avenue

V/C Ratio Std: LOS D
V/C Ratio***: LOS A (9.8 sec/veh)



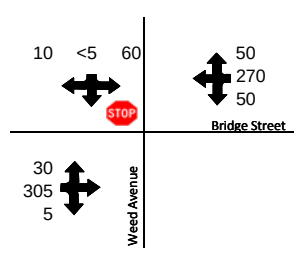
2 Bridge Street/Rose Avenue

V/C Ratio Std: 0.95/0.95
V/C Ratio: 0.38



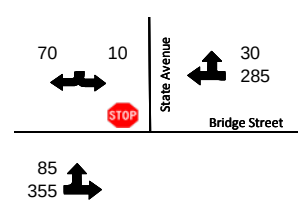
3 Bridge Street/Weed Avenue

V/C Ratio Std: 0.95/0.95
V/C Ratio: 0.04/0.31



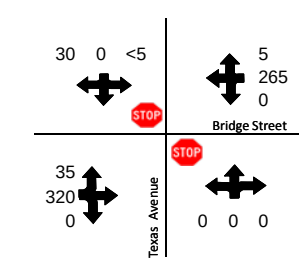
4 Bridge Street/State Avenue

V/C Ratio Std: 0.80/0.80
V/C Ratio: 0.22/0.20



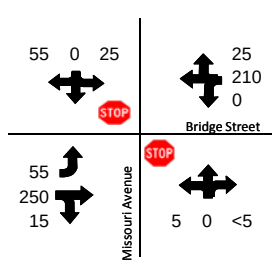
5 Bridge Street/Texas Avenue

V/C Ratio Std: 0.80/0.80
V/C Ratio: 0.03/0.06



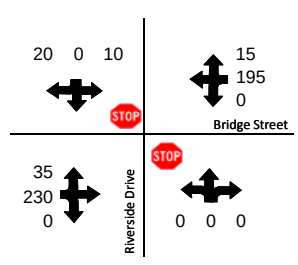
6 Bridge Street/Missouri Avenue

V/C Ratio Std: 0.80/0.80
V/C Ratio: 0.17/0.18



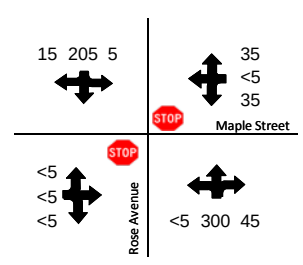
7 Bridge Street/Riverside Drive

V/C Ratio Std: 0.80/0.80
V/C Ratio: 0.03/0.06



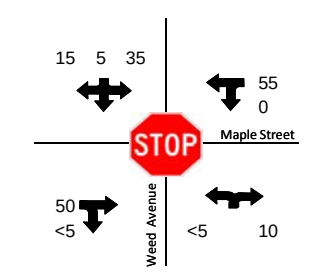
8 Maple Street/Rose Avenue

V/C Ratio Std: 0.80/0.80
V/C Ratio: 0.00/0.12



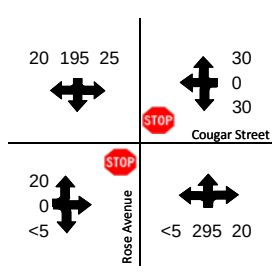
9 Maple Street/Weed Avenue

V/C Ratio Std: LOS D
V/C Ratio***: LOS A (7.5 sec/veh)

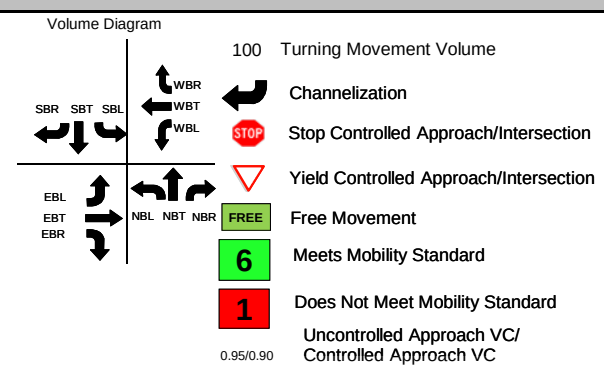


10 Cougar Street/Rose Street

V/C Ratio Std: 0.80/0.80
V/C Ratio: 0.02/0.15



Legend:



Notes:

1. Map Source: www.bing.com/maps
2. System peak hour occurred between 4:00 PM to 5:00 PM.
3. Mobility Standards are based on the Oregon Highway Plan or City of Vernonia LOS Standards.
4. Synchro software version 7 used for analysis.
5. VC = Volume to Capacity Ratio
6. V/C Ratio Std = Intersection Mobility Standard (per ODOT)

*** City of Vernonia has a LOS D mobility standard. LOS (avg delay/veh) is reported for the worst operating movement (for TWSC) and total intersection (for AWSC).

Year 2031 PM Peak Hour Future Conditions: Rounded and Balanced Volumes, Channelization, and Operations

Vernonia Transportation System Plan

Attachment C

Intersection: 1: Stoney Point Rd & State St

Movement	EB	WB	SB
Directions Served	LTR	LR	LTR
Maximum Queue (ft)	25	53	10
Average Queue (ft)	2	19	0
95th Queue (ft)	15	47	6
Link Distance (ft)	524	999	1041
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 2: Bridge St & Rose Ave

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	LT	R	LTR
Maximum Queue (ft)	50	100	79	97	65
Average Queue (ft)	25	26	33	25	33
95th Queue (ft)	51	69	58	82	56
Link Distance (ft)	1293	224	265		448
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)				75	
Storage Blk Time (%)			0	0	
Queuing Penalty (veh)			0	0	

Intersection: 3: Bridge St & Weed Ave

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	33	141	96
Average Queue (ft)	3	26	41
95th Queue (ft)	16	88	75
Link Distance (ft)	224	2044	618
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

HCM Unsignalized Intersection Capacity Analysis
1: Stoney Point Rd & State St

11/15/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	2	0	25	0	1	0	45	35	4	35	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	2	0	29	0	1	0	53	41	5	41	0
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	125	145	41	125	124	74	41			94		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	125	145	41	125	124	74	41			94		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	100	100	100	97	100	100	100			100		
cM capacity (veh/h)	850	748	1036	849	768	994	1568			1457		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	2	31	94	46
Volume Left	0	29	0	5
Volume Right	0	1	41	0
cSH	748	854	1568	1457
Volume to Capacity	0.00	0.04	0.00	0.00
Queue Length 95th (ft)	0	3	0	0
Control Delay (s)	9.8	9.4	0.0	0.8
Lane LOS	A	A		A
Approach Delay (s)	9.8	9.4	0.0	0.8
Approach LOS	A	A		

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	20.5%	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			Yield			Stop			Stop	
Volume (vph)	2	30	10	195	50	35	25	45	265	45	20	0
Peak Hour Factor	0.85	0.85	0.85	0.91	0.91	0.91	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	2	35	12	214	55	38	29	53	312	53	24	0

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	49	308	82	312	76
Volume Left (vph)	2	214	29	0	53
Volume Right (vph)	12	38	0	312	0
Hadj (s)	-0.13	0.10	0.14	-0.53	0.14
Departure Headway (s)	4.5	4.5	5.0	3.2	5.0
Degree Utilization, x	0.06	0.38	0.11	0.28	0.11
Capacity (veh/h)	748	774	668	1112	667
Control Delay (s)	7.8	10.2	8.6	7.4	8.6
Approach Delay (s)	7.8	10.2	7.7		8.6
Approach LOS	A	B	A		A

Intersection Summary			
Delay	8.7		
HCM Level of Service	A		
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	305	5	50	270	50	0	0	0	60	3	10
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.96	0.96	0.96	0.92	0.92	0.92	0.85	0.85	0.85
Hourly flow rate (vph)	35	359	6	52	281	52	0	0	0	71	4	12
Pedestrians					3			4			12	
Lane Width (ft)					12.0			0.0			12.0	
Walking Speed (ft/s)					4.0			4.0			4.0	
Percent Blockage					0			0			1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	345			369			861	886	369	859	863	319
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	345			369			861	886	369	859	863	319
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 %	97			96			100	100	100	72	99	98
cM capacity (veh/h)	1196			1195			252	261	675	256	269	714

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	400	385	86
Volume Left	35	52	71
Volume Right	6	52	12
cSH	1196	1195	282
Volume to Capacity	0.03	0.04	0.31
Queue Length 95th (ft)	2	3	31
Control Delay (s)	1.0	1.5	23.3
Lane LOS	A	A	C
Approach Delay (s)	1.0	1.5	23.3
Approach LOS			C

Intersection Summary			
Average Delay	3.4		
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	85	355	285	30	15	70
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	100	418	335	35	18	82
Pedestrians		1	7		6	
Lane Width (ft)		12.0	12.0		12.0	
Walking Speed (ft/s)		4.0	4.0		4.0	
Percent Blockage		0	1		1	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	377				984	360
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	377				984	360
tC, single (s)	4.1				6.5	6.3
tC, 2 stage (s)						
tF (s)	2.2				3.6	3.4
p0 queue free %	91				93	88
cM capacity (veh/h)	1171				244	669

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	518	371	100
Volume Left	100	0	18
Volume Right	0	35	82
cSH	1171	1700	512
Volume to Capacity	0.09	0.22	0.20
Queue Length 95th (ft)	7	0	18
Control Delay (s)	2.4	0.0	13.7
Lane LOS	A		B
Approach Delay (s)	2.4	0.0	13.7
Approach LOS			B

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	35	320	0	0	265	5	0	0	0	3	0	30
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.93	0.93	0.93	0.85	0.85	0.85	0.92	0.92	0.92	0.85	0.85	0.85
Hourly flow rate (vph)	38	344	0	0	312	6	0	0	0	4	0	35
Pedestrians		1			2							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		4.0			4.0							
Percent Blockage		0			0							
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	318			344			770	737	346	736	734	316
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	318			344			770	737	346	736	734	316
tC, single (s)	4.2			4.2			7.1	6.5	6.2	7.2	6.6	6.3
tC, 2 stage (s)												
tF (s)	2.3			2.3			3.5	4.0	3.3	3.6	4.1	3.4
p0 queue free %	97			100			100	100	100	99	100	95
cM capacity (veh/h)	1220			1177			294	335	696	314	325	701

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	382	318	0	39
Volume Left	38	0	0	4
Volume Right	0	6	0	35
cSH	1220	1177	1700	631
Volume to Capacity	0.03	0.00	0.00	0.06
Queue Length 95th (ft)	2	0	0	5
Control Delay (s)	1.1	0.0	0.0	11.1
Lane LOS	A		A	B
Approach Delay (s)	1.1	0.0	0.0	11.1
Approach LOS			A	B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	55	250	15	0	210	25	5	0	3	25	0	55
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.90	0.90	0.90	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	61	278	17	0	247	29	6	0	4	29	0	65
Pedestrians		1						3				
Lane Width (ft)		12.0						12.0				
Walking Speed (ft/s)		4.0						4.0				
Percent Blockage		0						0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	276			297			739	688	289	665	681	263
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	276			297			739	688	289	665	681	263
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.4	6.8	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.8	4.3	3.6
p0 queue free %	95			100			98	100	100	91	100	91
cM capacity (veh/h)	1275			1233			292	353	753	320	319	706

Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1
Volume Total	61	294	276	9	94
Volume Left	61	0	0	6	29
Volume Right	0	17	29	4	65
cSH	1275	1700	1233	379	513
Volume to Capacity	0.05	0.17	0.00	0.02	0.18
Queue Length 95th (ft)	4	0	0	2	17
Control Delay (s)	8.0	0.0	0.0	14.7	13.6
Lane LOS	A			B	B
Approach Delay (s)	1.4		0.0	14.7	13.6
Approach LOS				B	B

Intersection Summary			
Average Delay	2.6		
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
7: Bridge St & Riverside Dr

11/15/2010

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	35	230	0	0	195	15	0	0	0	10	0	20
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.92	0.92	0.92	0.85	0.85	0.85
Hourly flow rate (vph)	41	271	0	0	229	18	0	0	0	12	0	24
Pedestrians								2				
Lane Width (ft)								12.0				
Walking Speed (ft/s)								4.0				
Percent Blockage								0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	247			273			617	602	273	591	593	238
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	247			273			617	602	273	591	593	238
tC, single (s)	4.1			4.2			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.3			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			100			100	100	100	97	100	97
cM capacity (veh/h)	1301			1260			383	402	770	411	407	806

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	312	247	0	35
Volume Left	41	0	0	12
Volume Right	0	18	0	24
cSH	1301	1260	1700	610
Volume to Capacity	0.03	0.00	0.00	0.06
Queue Length 95th (ft)	2	0	0	5
Control Delay (s)	1.3	0.0	0.0	11.3
Lane LOS	A		A	B
Approach Delay (s)	1.3	0.0	0.0	11.3
Approach LOS			A	B

Intersection Summary			
Average Delay	1.3		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	3	2	2	35	3	35	3	300	45	5	205	15
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.89	0.89	0.89
Hourly flow rate (vph)	4	2	2	41	4	41	4	353	53	6	230	17
Pedestrians		4			1			4				
Lane Width (ft)		12.0			12.0			12.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		0			0			0				
Right turn flare (veh)						1						
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	663	668	247	645	650	380	251			407		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	663	668	247	645	650	380	251			407		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.6	4.1	3.4	2.2			2.2		
p0 queue free %	99	99	100	89	99	94	100			100		
cM capacity (veh/h)	347	377	792	369	376	653	1298			1151		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	8	86	409	253
Volume Left	4	41	4	6
Volume Right	2	41	53	17
cSH	425	710	1298	1151
Volume to Capacity	0.02	0.12	0.00	0.00
Queue Length 95th (ft)	1	10	0	0
Control Delay (s)	13.6	13.6	0.1	0.2
Lane LOS	B	B	A	A
Approach Delay (s)	13.6	13.6	0.1	0.2
Approach LOS	B	B		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	38.2%	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			Stop			Stop	
Volume (vph)	0	50	2	0	55	0	3	0	10	35	5	15
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Hourly flow rate (vph)	0	59	2	0	65	0	4	0	12	41	6	18

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	61	65	15	65
Volume Left (vph)	0	0	4	41
Volume Right (vph)	2	0	12	18
Hadj (s)	0.06	0.05	0.15	0.01
Departure Headway (s)	4.2	4.2	4.4	4.2
Degree Utilization, x	0.07	0.08	0.02	0.08
Capacity (veh/h)	833	837	785	828
Control Delay (s)	7.5	7.5	7.5	7.6
Approach Delay (s)	7.5	7.5	7.5	7.6
Approach LOS	A	A	A	A

Intersection Summary			
Delay	7.5		
HCM Level of Service	A		
Intersection Capacity Utilization	22.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	20	0	3	30	0	30	4	295	20	25	195	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.87	0.87	0.87
Hourly flow rate (vph)	24	0	4	35	0	35	5	347	24	29	224	23
Pedestrians		8										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		4.0										
Percent Blockage		1										
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	705	681	244	665	681	359	255			371		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	705	681	244	665	681	359	255			371		
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 %	93	100	100	90	100	95	100			98		
cM capacity (veh/h)	325	362	795	365	362	690	1295			1188		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	27	71	375	276
Volume Left	24	35	5	29
Volume Right	4	35	24	23
cSH	352	477	1295	1188
Volume to Capacity	0.08	0.15	0.00	0.02
Queue Length 95th (ft)	6	13	0	2
Control Delay (s)	16.1	13.8	0.1	1.0
Lane LOS	C	B	A	A
Approach Delay (s)	16.1	13.8	0.1	1.0
Approach LOS	C	B		

Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 4: Bridge St & State St

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (ft)	162	22	92
Average Queue (ft)	43	1	43
95th Queue (ft)	114	12	73
Link Distance (ft)	2044	1937	3068
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Bridge St & Texas Ave

Movement	EB	SB
Directions Served	LTR	LR
Maximum Queue (ft)	99	62
Average Queue (ft)	16	17
95th Queue (ft)	59	43
Link Distance (ft)	1937	1754
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Bridge St & Missouri Ave

Movement	EB	NB	SB
Directions Served	L	LR	LR
Maximum Queue (ft)	47	28	126
Average Queue (ft)	8	6	49
95th Queue (ft)	31	22	94
Link Distance (ft)		287	314
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	100		
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 7: Bridge St & Riverside Dr

Movement	EB	SB
Directions Served	LTR	LR
Maximum Queue (ft)	66	46
Average Queue (ft)	10	17
95th Queue (ft)	40	41
Link Distance (ft)	1613	674
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 8: Maple St & Rose Ave

Movement	EB	WB	WB	NB	SB
Directions Served	LTR	LT	R	LTR	LTR
Maximum Queue (ft)	32	84	68	42	43
Average Queue (ft)	5	28	33	3	1
95th Queue (ft)	24	65	66	22	23
Link Distance (ft)	488	298		252	265
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)			25		
Storage Blk Time (%)		5	4		
Queuing Penalty (veh)		2	2		

Intersection: 9: Maple St & Weed Ave

Movement	EB	WB	NB	SB
Directions Served	TR	LT	LR	LTR
Maximum Queue (ft)	71	63	73	63
Average Queue (ft)	29	26	17	29
95th Queue (ft)	57	49	56	55
Link Distance (ft)	298	630	226	264
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 10: Cougar St & Rose Ave

Movement	EB	WB	NB	SB
Directions Served	LR	LR	LTR	LTR
Maximum Queue (ft)	49	73	19	57
Average Queue (ft)	19	34	1	9
95th Queue (ft)	49	61	8	40
Link Distance (ft)	548	236	1717	252
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 4

APPENDIX E

SYSTEM SOLUTIONS REPORT

Transportation System Solutions Report: City of Vernonia Transportation System Plan Update

PREPARED FOR: Carole Connell, City of Vernonia
Bill Haack, City of Vernonia
Seth Brumley, ODOT

PREPARED BY: Terra Lingley, CH2M HILL
Larry Weymouth, CH2M HILL
Mike Tresidder, Alta Planning + Design
Elliot Akwai-Scott, Alta Planning + Design

COPIES: Vernonia TSP Update PMT and PAC

DATE: February 21, 2011,
Revised March 25, 2011

This memorandum documents the transportation improvement alternatives that will be considered by the City of Vernonia Transportation System Plan (TSP) update technical team. The basis for these concepts came from a brainstorming session with the Project Management Team (PMT), were further refined at a Community Workshop held on January 13, 2011, discussed at the Community Briefing on February 16, 2011 and the Joint Planning Commission and City Council worksession on March 3, 2011.

Introduction

This memorandum provides a range of alternatives for addressing deficiencies and needs identified in Technical Memo #2 (Existing Conditions and Deficiencies) and Technical Memo #4 (Future Conditions and Deficiencies). Per the scope of work, two packages of solutions were developed: a low-cost package of solutions and a high-cost package. These two packages were chosen because existing and future conditions analysis determined that the operation of the transportation system did not warrant capacity improvements. Long-term aspirational improvement alternatives were included in the high-cost package, while short- and medium-term improvement alternatives that are more likely to be funded in the short-term were included in the low-cost package. The PMT and Project Advisory Committee (PAC) will prioritize and determine appropriate time frames for implementation of the recommended solutions in the TSP update document, though some of the following projects include a discussion of priority related to other recommended projects.

Both packages include multimodal transportation improvement alternatives that would address existing and future needs and deficiencies. These potential projects are a result of school and business relocations, as prompted by floods and an increase in the City's commercial land inventory. Both packages also identify planning-level cost estimates, and potential funding sources.

The following alternatives were analyzed for potential environmental constraints, and impacts to Goal 5 resources (natural resources, scenic and historic areas, and open spaces).Before more detailed design and construction of the individual alternatives, additional surveying and environmental work may need to be completed.

Consistency with Goals, Policies, and Plans

Alternatives were developed with the project goals, plans and policies in mind. An in-depth discussion of the applicable goals and policies is included in Technical Memorandum #1 (Goals, Policies, and Plans).

The applicable goals and policies from the 1999 TSP are noted below:

- Goal 2: Operation and Safety – Preserve and improve the function, capacity, level of service, and safety of the roadway system
- Goal 3: Transportation Alternatives – Support the use of other modes of transportation (bicycles, pedestrians, equestrians, and transit) through effective transportation improvements
- Goal 5: Finance – Use a sound fiscal approach to financing transportation system improvements.

Project goals for this TSP update include:

- Operation and Safety
    - Preserve and Improve the function, capacity, and level of service and safety of the roadway system
- Transportation Alternatives
    - Support the use of other modes, especially bicycles and pedestrians, including transit
    - Support Safe Routes to Schools programming and projects
    - Receive input on airport operations and expansion
- Finance
    - Create a sound fiscal approach to financing transportation system improvements

These goals will need to be included in the Vernonia Comprehensive Plan once the TSP update is adopted.

Overview of Existing and Future Deficiencies and Needs

The analysis of existing and future transportation conditions showed that no expansion of State or City owned roadways was needed, because there are and would be no capacity or operational deficiencies. However, several city streets are in need of repair and maintenance, and the street network would benefit from better connectivity. City

street design standards are in need of revision to be consistent throughout the applicable standards documents, and should be modified to better reflect the existing street right-of-way widths, and the local character of the streets within the City. Some areas of Highway 47 and Bridge Street could be improved to increase sight distance and enhance safety. New sources of funding for street maintenance and upgrades need to be identified, and priorities determined for project funding.

Existing conditions, deficiencies, and needs in the City are included below:

Land Use Inventory

- Most land in Vernonia is zoned residential.
- There are some buildable lands still available for development, mostly in residentially zoned areas, with some zoned light industrial.

Traffic Operations

- All 10 study area intersections operate within State and City standards.
- There are currently no vehicle queues that exceed available storage capacity.
- There is little off-highway network connectivity throughout the city.
- The intersection of Rose Avenue/Bridge Street can be confusing for visitors.

Bicycle and Pedestrian Facilities

- There is a bike lane for approximately one third of a mile along OR 47 within the City Limits. The highway lacks shoulders through central Vernonia between O-A Hill and Rose Street due to topographical constraints and on-street parking.
- Cyclists share the travel lane over Rock Creek and Nehalem River Bridges.
- Most local streets could be considered shared roadways due to their low speeds and low traffic volumes.
- There are some newly developed areas with sidewalks, though these are not always continuous.
- Downtown and adjacent streets have a connected network of sidewalks with pedestrian amenities.
- Maple Street, Cougar Street, and Weed Avenue are lacking sidewalks near the downtown area.
- O-A Hill is the main obstacle to east-west pedestrian movement within Vernonia; a sidepath along the south side of OR 47 is the only option for pedestrians
- There are very few sidewalks between O-A Hill and the Nehalem River.
- Mist drive north of Bridge Street does not have any dedicated pedestrian facilities.

A summary of the future conditions and needs is included below:

Future Land Use

- With current zoning, the buildable land supply will be more than adequate to meet both residential and industrial land needs through 2031. However, the supply of buildable commercial land is not sufficient to meet the projected commercial land demand.
- Vacant Industrial land development is constrained by a lack of public facilities and services and the high cost to provide those services
- The alternative land use scenario would add 9 acres of commercial land to the Downtown (DT) commercial district. Under this scenario, the buildable land supply within Vernonia would be adequate to meet residential, commercial, and industrial land needs through 2031.

Future Traffic and Transportation

- All study intersections are anticipated to operate within acceptable mobility standards in the Year 2031 PM peak hour.
- Several left turn lane warrants were met for eastbound and westbound left turn movements along Bridge Street. No right turn lane warrants were met at any study intersections for the PM peak hour.

Technical Memorandums 2 (Existing Conditions), 4 (Future Conditions), and 5 (Safe Routes to New Schools) provide additional details of existing and future conditions.

In addition to the existing and future needs described above, the City indicated that the street standards need to be revised to provide consistency between the public works standards and the previous TSP adopted in 1999. This TSP update will create consistent street standards for the City to use, supplanting the existing inconsistent standards.

Concurrent with the TSP update, the City and School District are in the process of constructing new elementary, middle, and high schools to replace the existing schools which are currently located within the floodplain. Part of the TSP process will suggest projects and programs to create safe routes to the new schools.

Both the updated street standards and the Safe Routes to Schools work will address bicycle and pedestrian facilities, with an emphasis on the network near the new school site.

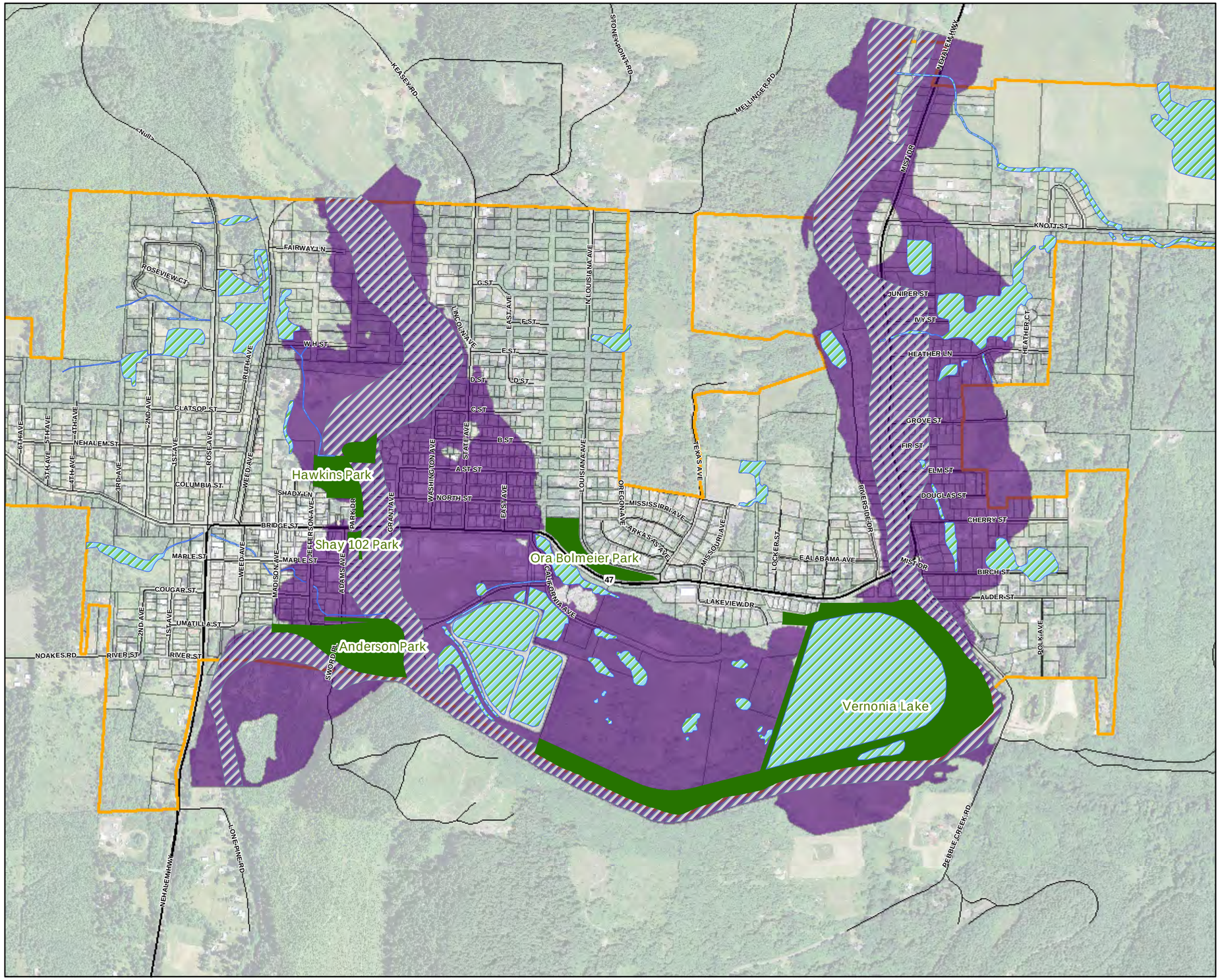
Environmental Considerations

Potential Goal 5 resource impacts and environmental constraints in Vernonia are shown on Figure 1. Goal 5 resources include natural resources, parks, open spaces, historic buildings, and scenic vistas in the city. These include the Nehalem River, Rock Creek, Vernonia Lake, Anderson Park, Hawkins Park, Memorial, Pioneer, and Hall-Tipton cemeteries, and views along the Banks-Vernonia Trail. Environmental issues of concern are identical for both alternative packages. These concerns include changes to drainage flows resulting from transportation improvements that could contribute to flooding of roadways and other public lands and private properties. Hydraulic engineering for the designed improvements are anticipated to resolve these concerns. Environmental

constraints affecting the development and implementation of transportation improvement projects in Vernonia include wetlands and floodplain scattered throughout the UGB, and topography such as O-A Hill and Corey Hill.

The floodplain and floodway are serious constraints within the City, including impacting the downtown core and the two bridges along OR 47. The 100 year floodplain and floodway encompasses the majority of Mist Drive north of Bridge Street.

This page intentionally left blank



VICINITY MAP

LEGEND

- Study Area
- LocalWetlandsInventory2001
- Parks
- State Highway
- Streets
- 100 year Floodway
- 100 Year Inundated
- LocalWetlandsInventory2001

N

0 250 500 1,000
Feet

FIGURE 1
Goal 5 Resources
Vernonia Transportation System Plan
City of Vernonia, Oregon

CH2MHILL

This page intentionally left blank

High-Cost Build Alternatives

Figure 2 identifies potential alternatives for the high-cost package. These high cost projects are in no particular order of priority or timing. Projects will be grouped into high, medium and low priorities along with suggested implementation timing for the TSP update document. High-cost alternatives include:

1. Widen OR 47 – Provide a Bicycle/Pedestrian Path on Both Sides

OR 47 along O-A Hill currently has a bicycle and pedestrian path along the south side on the outside of the guardrail. The highway is very narrow around O-A Hill, and with the current configuration, there is no room for pedestrians or bicyclists on the north side of the highway. This alternative would widen the highway, which would require improvements to the existing retaining wall and potentially some additional cutting into the slope north of the highway.

This alternative would reduce the number of times students and other bicyclists and pedestrians who live north of OR 47 would need to cross the highway to access sidewalks when walking or bicycling along OR 47/Bridge Street to the new school site off of Missouri Street. Currently students who live north of OR 47/Bridge Street would need to cross the highway a total of four times a day to access the sidepath on the south side of O-A Hill to get to and from school. This is out of direction and a potential safety issue as there is no formal crosswalk on the west side of O-A Hill. There will be a formal crosswalk on the east side of Missouri Avenue to access the new schools. Many students currently cross the highway at a diagonal or use the informal narrow path along the north side of the highway adjacent to the slope when walking to the current school site from east of O-A Hill.

Alternative 1 could affect trees on O-A Hill for the expansion of the highway and potential retaining wall on the north side. Impacts to trees will need to be considered during the design phase.

2. Create a Pedestrian and Bicycle Connection between California Avenue and Missouri Avenue

Improving California Avenue would provide an off-highway route for students south of OR 47 to get around O-A Hill to connect to Missouri Avenue. The right of way for California Avenue is currently platted, and part of the road currently exists, but it does not connect to Missouri Avenue. This alternative would connect the end of California Avenue to Lakeview Drive and Missouri Avenue as a pedestrian and bicycle path. There is a large change in elevation that will need to be addressed between the currently platted California Avenue and Bridge Street.

Alternative 2 could have some impacts on environmental resources. California Avenue is currently located within the 100 year inundated floodplain, and there are a number of wetlands on either side of the platted street.

3. Create Bicycle and Pedestrian Bridge over the Nehalem River

This project would create a new bicycle and pedestrian bridge over the Nehalem River north of Bridge Street. This would allow students who live near Mist Drive to cross the

river and access the new schools site without having to use the Green Bridge and the associated narrow pedestrian and bicycle facilities. This should also be connected with a bicycle and pedestrian path to link to other safe routes to school, providing a continuous and safe way for students to bicycle or walk to school. The narrowest part of the floodplain over the Nehalem River is in the vicinity of Alabama Avenue; however, further design and information is needed before an exact location is determined.

Alternative 3 could impact the floodway and floodplain, however, a bicycle and pedestrian bridge has different requirements than roadway bridges with respect to the floodplain.

4. Connect Future Crown-Zellerbach Trail to the Banks-Vernonia Trail

This alternative would create an off-street shared-use path connection between the end of the Banks-Vernonia Trail near Vernonia Lake, and the future Crown-Zellerbach Trail to Scappoose that would enter Vernonia from the east. Rather than provide an on-street connection via OR 47/Mist Drive and Knott Street, this path connection would turn south from Knott along an existing power line alignment and cross the Nehalem River with the construction of a new bicycle and pedestrian bridge near Mist Drive and Polk Avenue. There are currently a number of organizations working to complete and connect the two trails. This project would coordinate with those groups to ensure that the two trails are able to connect.

Alternately, as houses are vacated and sold to the City on the east side of Mist Drive, it is possible to create a linear park north-south through the "tree streets." The Crown-Zellerbach trail could connect to this linear park, and use the alignment to travel south to the Banks-Vernonia Trail.

Alternative 4 may have some environmental impacts to floodplain and wetlands, but the nature of the trail and the recreational use is not expected to have any significant impacts.

5. Reconfigure the Mist Drive/Bridge Street Intersection

The current Mist Drive/Bridge Street Intersection is confusing for travelers, as most of the vehicles turn north to follow the highway. The existing intersection is configured as a "Y", with a triangular curb area separating north and southbound traffic on Mist Drive south of the intersection with the highway. There are signs in the intersection, but they do not provide enough warning for drivers unfamiliar with the area to determine which direction is appropriate to follow the highway.

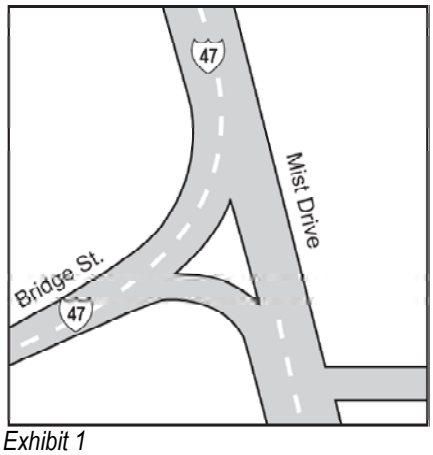


Exhibit 1
Existing Bridge Street and Mist Drive Intersection

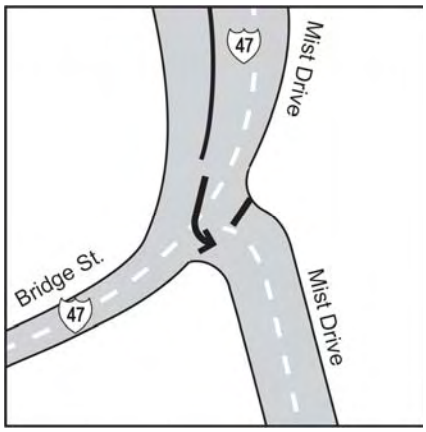


Exhibit 2
Intersection Alignment Alternative

Reconfiguring the intersection would provide more certainty for all drivers and reduce confusion at this intersection.

This alternative would realign Mist Drive south of the highway, creating one connection with the northbound curve of the highway. This would provide certainty for drivers that the highway continues to the north, and Mist Drive south of Bridge Street is a local street. Exhibit 2 shows the approximate realignment.

Alternative 5 is located within the floodway and floodplain, but there are no additional environmental considerations.

6. Create a Bicycle/Pedestrian Connection to the New School from Riverside Drive

This facility would connect the new Vernonia Schools site to Riverside Drive to the east with a new off-street shared use path. The school site plan already includes a path heading east from school property. This path would connect to the planned school path and allow students living in the future Nehalem View estates or along Riverside Drive to access the new school sites without having to walk along Bridge Street/OR 47. The path would extend down Riverside Drive towards Bridge Street. The intersection of Bridge Street and Riverside Drive was identified as a dangerous one for bicyclists and pedestrians trying to cross the highway. This crossing and the access to Vernonia Lake would need to be addressed when this project is implemented. This alternative could be implemented in phases to help reduce project costs, and tied to future development along Riverside Drive.

Alternative 6 could have some impacts to a wetlands area adjacent to the new schools; however, the nature of the bicycle and pedestrian connection would allow the design to minimize environmental impacts.

7. Potential Street Connections to Improve Connectivity

There is limited connectivity both east-west and north-south throughout the City. Because of this, many local trips use OR 47 to reach various destinations throughout town. While there are currently no operational issues along the highway, providing options for traffic to use local streets as opposed to the highway would allow residents to bicycle and walk on local streets instead of OR 47. Providing a choice of routes for road users could decrease traffic on the highway and reduce pressure to widen the highway in the future. There are a number of places where connectivity improvements are being suggested, and all future connection designs are dependent upon further engineering and environmental studies. Potential connectivity improvements are described below:

7a. North-South Pedestrian and Bicycle Connection East of Mist Drive

This would connect the "tree streets" east of Mist Drive with a north-south trail or linear park connection. There is no City right of way platted in this area, but many of the houses east of Mist Drive have been or are actively being purchased by the City because they are located in the flood zone. Prior to construction, the City would need to coordinate the property buy-out, and determine where the path/linear park should be located.

Alternative 7a has a number of potential environmental considerations; the area is largely within the 100 year floodplain, and there are several identified wetlands within the approximate location of any north-south connection. The nature of the trail connection would minimize impacts to floodplains and wetlands.

7b. East-West Road Connection North of Knott Avenue

This connection would serve the future industrial land in the northeast of the City. The future street would provide an alternate access to the industrial parcel, and could connect to Knott Street. Development of this street connection could occur at the same time the industrial parcel develops. There are no platted streets in the vicinity, and any connection would require the City to obtain an easement or purchase right of way from adjacent landowners.

Alternative 7b would be partially located within the 100 year floodplain and could potentially impact wetlands or a small creek. During design, environmental considerations should be taken into account.

7c. North-South Road Connection to Complete Louisiana Avenue

Currently, Louisiana Avenue does not connect for through traffic between the northern and southern parts of the road. The connection is graveled and restricted to pedestrian use by large cement bollards, and there are approximately two blocks where the street does not go through. Opening the street to through traffic would allow those who live along Louisiana to have a choice when leaving the neighborhood, and would provide an alternate route to OR 47. During discussions with the PMT and PAC groups, this was identified as a low priority for the TSP update.

Alternative 7c could potentially impact documented wetlands, and there are additional topographical constraints to consider during design.

7d. North-South Connection between Texas Avenue and Mellinger Road

Currently, Texas Avenue ends at the Urban Growth Boundary (UGB) just north of the new school site. Mellinger Road is located to the north, along the northern UGB boundary. Connecting the two roads would allow additional access into the future Nehalem View Estates and could provide a northern connection to the new school site. There are a number of issues with this connection: it would require the road to be, in part, outside of the UGB, and would connect to a roadway that is largely outside of the UGB. Coordination with Columbia County would need to occur for this connection to be approved and constructed. There are no roads platted in this area, and the City would need to obtain an easement or purchase right of way from adjacent landowners.

This project could be phased depending on how and when the Nehalem View Estates are developed. Phase I would connect the development south to Texas Avenue. As more

houses are constructed in the development, the connection could be extended north to connect to Mellinger

Alternative 7d would be located outside of the City's UGB, and potentially in an area with topographical constraints. There are no identified potential environmental considerations associated with the potential roadway connection.

8. Potential Transit Improvements

During the first PMT/PAC meeting, the committee members discussed adding a formalized park and ride area. Currently the Columbia County Rider busses stop near City Hall to pick up riders, and there are no established stops within Vernonia.

Public transit improvements are dependent upon demand and funds available to Columbia County. Potential improvements include additional park-and-ride facilities. Park and ride facilities could be located near the former school sites or the former WOEC site once those have been vacated, but will need to take into account floodplain restrictions. No cost estimate is provided for a park-and-ride lot, because it would likely use existing facilities.

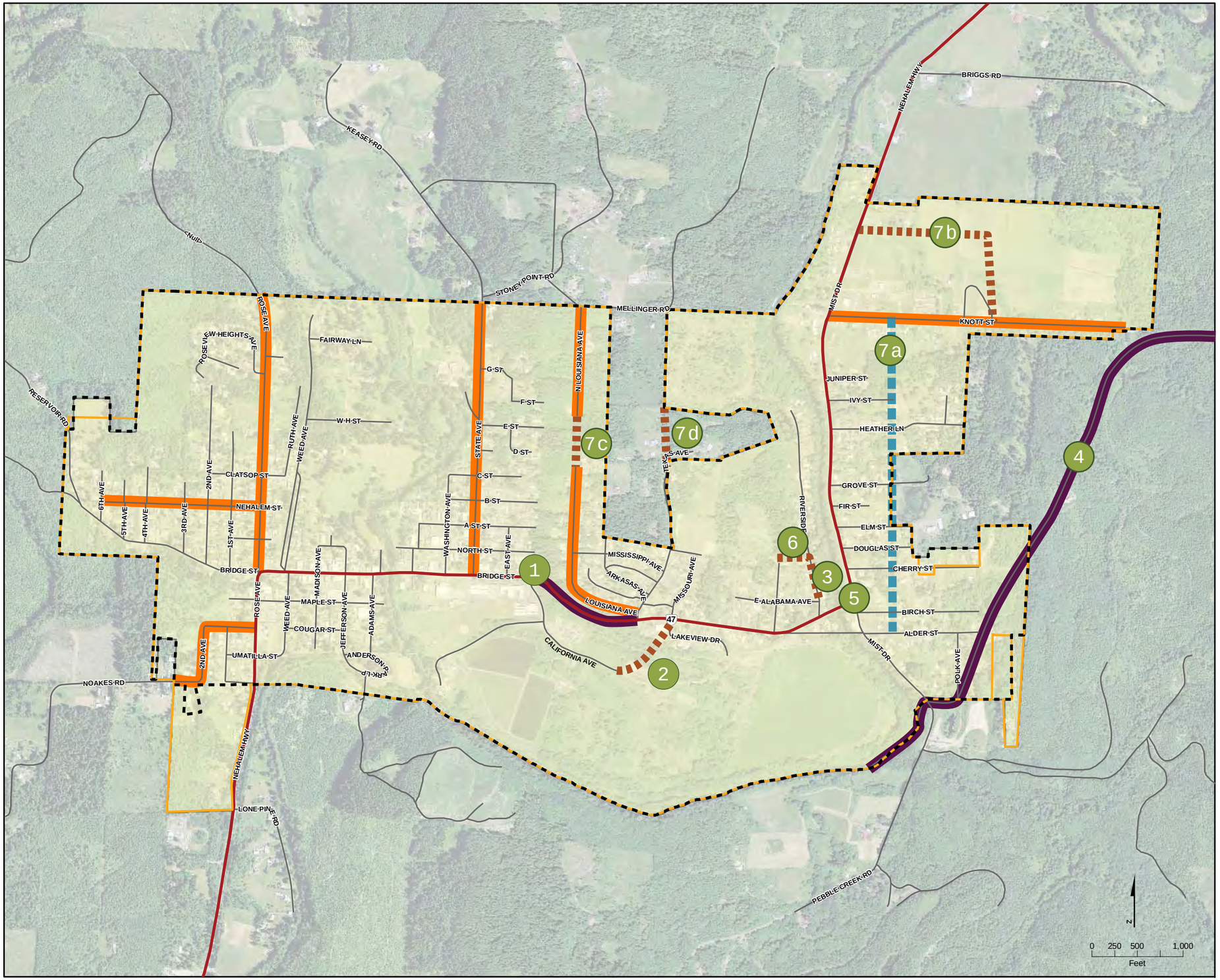
Alternative 8 could have environmental considerations depending on where the park-and-ride is located. One option would create a gravel parking area once the current schools are vacated.

Other Recommendations

In addition to the physical improvements suggested above, the PAC and PMT recommended a further study of east-west connectivity between Weed Avenue and Ruth Street, and how to utilize the currently vacant railroad grade north of Bridge Street. There is little connection between Ruth and Weed and the surrounding neighborhood. The PAC and PMT expressed interest in studying further concepts to connect the area and provide alternate access to Bridge Street.

Table 1 lists the planning level cost estimates and potential funding sources for each alternative.

This page intentionally left blank



VICINITY MAP

LEGEND

- State Highway
- Streets
- City Limits
- Urban Growth Boundary
- Study Area
- Collector Streets
- Recommended Street Connections
- Linear Park/Trail Through City-Owned Properites

1. Widen OR47; add bicycle/pedestrian path on both sides.
2. Pedestrian and bicycle connection between California and Missouri Avenues.
3. Add a dedicated bicycle/pedestrian bridge adjacent to the Green Bridge. Exact location to be determined.
4. Connect future Crown-Zellerbach Trail to the Banks-Vernonia Trail.
5. Reconfigure the Mist Drive/Bridge Street intersection.
6. Create a bicycle and pedestrian connection to the new school from Riverside Drive.
7. Potential Connectivity Improvements
   - 7a. Pedestrian/bicycle trail only. Could connect to the future Crown-Zellerbach Trail.
   - 7b – 7d. Roadway connections.

Note: Location of street and path connections are approximate and subject to design review process and environmental considerations

High-Build (Long Term) Options

Vernonia Transportation System Plan

City of Vernonia, Oregon

This page intentionally left blank

TABLE 1
Summary of High-Cost Alternatives
Cost Estimates and Potential Funding Sources

Number	Alternative	Estimated Cost	Potential Funding	Comments
1	Widen OR 47, add bicycle and pedestrian path on both sides	$8,463,000	ODOT Transportation Enhancements (TE), ODOT Modernization, ODOT Bicycle and Pedestrian Program	This alternative would require improving the existing retaining wall on the south side of the highway, and could require additional cut to the O-A Hill adjacent to the highway.
2	Create a Pedestrian and Bicycle Connection between California Avenue and Missouri Avenue	$450,000	City System Development Charges, Local Improvement District (LID)	There is a difference in elevation between California Avenue and Bridge Street – this concept would need to address the height difference.
3	Create a bicycle/pedestrian bridge over the Nehalem River in the vicinity of Alabama Avenue.	$1,689,000		
4	Connect Future Crown-Zellerbach Trail to Banks-Vernonia Trail	$1,710,000	Oregon State Parks Recreational Trails Grant; Land and Water Conservation Fund; Urban Trails Fund; ODOT Transportation Enhancements (TE)	Cost estimate reflects 5,700 feet of 12' shared-use path and a 14' wide; 200' long prefabricated steel truss bridge.
5	Reconfigure the Mist Drive/Bridge Street intersection	$369,000	ODOT Modernization, ODOT operations	This would "T" up the south leg of Mist Drive to the curve as Bridge Street transitions into Mist Drive. This would require a southbound turn lane onto southbound Mist Drive south of Bridge Street, and some widening of the highway on Mist Drive north of the intersection.
6	Create a Bicycle/Pedestrian Connection to the New Schools from Riverside Drive	$230,000	Community Development Block Grants (CDBG); Developer Contribution; Local Improvement District (LID)	Cost estimate reflects 1,450 feet of 12' shared-use path. This follows the edge of the school lot from Riverside to Missouri, though the last segment near Missouri may be unnecessary, in future parking lot.
7a	Add a pedestrian/bicycle trail north-south east of Mist Drive/OR 47 to connect the "tree streets"	$452,000	Oregon State Parks Recreational Trails Grant; Land and Water Conservation Fund; Urban Trails Fund; ODOT Transportation Enhancements (TE)	
7b	Add an east-west local street north of Knott Street to provide additional access to the light industrial parcel east of Mist Drive/OR 47	$2,647,000		Would connect down to Knott Street
7c	Connect the north and south sections of Louisiana Avenue	$358,000	City System Development Charges, Local Improvement District (LID)	Would improve the existing gravel
7d	Connect Texas Avenue to Mellinger Road at the north of the City's UGB	$1,445,000		
8	Potential Transit Improvements –park and ride facilities	N/A	Transit System Advertising, ODOT Public Transportation Programs (Capital Investment)	Could use existing facilities, design and placement would need to consider ADA and floodplain requirements and restrictions.

Note: Costs are planning-level and do not include right of way acquisition. Alternatives are generally long-term.

This page intentionally left blank

Low-Cost Build Alternatives

Figure 3 identifies proposed alternatives for the low-cost build package. They include:

A. Improve Signage at OR 47 and Rose Avenue

The intersection of OR 47 and Rose Avenue is confusing for visitors. The majority of traffic follows the highway and turns right at Bridge Street, and the green turn arrow indicates that it is free flow. A flashing red light requires northbound traffic to stop on Rose Avenue before proceeding through the intersection.

This alternative would increase the signage and visibility of the intersection, and would provide a visual cue for drivers that they need to turn right to follow the state highway.

Alternative A is not expected to have any significant environmental impacts.

B. Improve Pedestrian Crossing at OR 47 – Access to Sidepath on O-A Hill

This project would improve crossing conditions for pedestrians and bicyclists accessing the current sidepath on the south side of OR 47/Bridge Street to traverse O-A Hill, which is a key route to the new Vernonia Schools site. The exact location of the crossing would need to be determined with input from the school and ODOT, as O-A Hill topography could impact speeds and safety at a crossing at the base of the hill. Treatments for the crossing include new sidewalks along the north side of Bridge Street, new sidewalks to connect with the side path, a crosswalk, warning signage, and curb ramps.

Alternative B is not expected to have any significant environmental impacts.

C. Add Sidewalk along OR 47/Mist Drive on the East Side

A sidewalk along the east side of OR 47/Mist Drive would provide a pedestrian connection to the Green Bridge for residents living on the east side of the Nehalem River. This is a lower priority as the pedestrian and bicycle path connecting the "tree streets" (Project 7a) is preferred by both the PMT and the PAC.

Alternative C would require adding pavement or asphalt along Mist Drive/OR 47 to construct a pedestrian sidewalk. Much of this section of the highway is located within both the 100 year floodway and floodplain.

D. Add Sidewalks or Connect Existing Sidewalks and Bicycle Facilities along Collector Streets

Collector Streets within Vernonia include Knott Street, Louisiana Avenue, State Avenue, Rose Avenue north of Bridge Street, Nehalem Street west of Rose Avenue, and the Cougar Street connection to 2nd Avenue in the southwest part of the City. These collector streets do not have consistent sidewalks or bicycle facilities, but are meant to carry higher traffic volumes than local streets. It is important to ensure that they accommodate all users. These improvements are consistent with the recommended street standards that will be included in the TSP update and included below.

Many of the collector roads are located within the 100 year floodplain and improving these streets for bicycles and pedestrians could have environmental considerations;

however, the improvements are not expected to significantly impact environmental resources as the roadways already exist.

E. Add Bicycle and Pedestrian Connection between New Schools and Nehalem View Subdivision

This facility would connect the new Vernonia Schools site to the Nehalem View residential development north of the school, with a new off-street shared use path. This project serves a similar purpose of connecting Texas Avenue to the Nehalem View Estates development (Project 7d). If the roadway connection is developed first, this project will take a lower priority, and should be reevaluated to see if it is needed.

Alternative E is not expected to have any significant environmental impacts.

F. Restricting Parking at Corners on OR 47

Within the downtown core of Vernonia, between Rose Avenue and the Rock Creek Bridge, parking is allowed on both sides of Bridge Street/OR 47, though restricted at street corners by curb bulb-outs and yellow striping. However, the yellow striping is often ignored, and parked cars adjacent to the corners make it difficult to determine if there is oncoming traffic when attempting to pull out onto Bridge Street from a driveway or local road. Striping at corners, creating curbed bioswales, installing pavement bumps, or extending the curb bulb-outs would enforce no parking near street corners. This would increase the distance drivers are able to see, and would allow them to safely pull out onto the highway. Current public works standards restrict parking within 30 feet and 45 feet of the curb return on local and collector streets, respectively. There are no standards for parking at corners along Bridge Street/OR 47, the only arterial road within Vernonia. Restricting parking at corners along Bridge Street/OR 47 in the downtown core especially could reduce on-street parking. A parking inventory or study is recommended prior to implementation, working with local businesses to ensure adequate parking supply.

Alternative F is not expected to have any significant environmental impacts.

G. Safe Routes to School Connection Improvement Alternatives

These improvement alternatives are targeted at areas near the new school site to help enhance the bicycling and pedestrian environment for students who live in Vernonia. Improvements include adding a 6 foot sidewalk on one side of the street with no dedicated curb or gutter. Specific streets are identified below for improvements:

G1. Safe Routes to School Connection – Alabama Avenue

This project would create an improved bicycle and pedestrian route between the new schools site and Bridge Street near the Nehalem River Bridge. Currently Alabama Avenue is approximately 20 feet wide no dedicated bicycle or pedestrian facilities and a narrow shoulder. The street is a direct, lower traffic volume street for non-motorized users that avoids potential conflicts and higher traffic volumes on Bridge Street. The proposed 6 foot sidewalks on one side of the street would provide a separate area for students to walk and bicycle to school.

G2. Safe Routes to School Connection – Mississippi Avenue

This project would create an improved bicycle and pedestrian route between the new schools site and Ora Bolmeier Park, accessing a soft-surface trail up O-A Hill. Currently Mississippi Avenue is approximately 20 feet wide no dedicated bicycle or pedestrian facilities and a narrow shoulder. The street is a direct, lower traffic volume street for non-motorized users that avoids potential conflicts and higher traffic volumes on Bridge Street. The proposed 6 foot sidewalks on one side of the street would provide a separate area for students to walk and bicycle to school.

G3. Safe Routes to School Connection – Texas Avenue

This project would create an improved bicycle and pedestrian route between the new schools site and Bridge Street. Texas is an alternate, parallel route to Missouri Avenue, and is a direct, lower traffic volume street for non-motorized users that avoids potential conflicts and higher traffic volumes on Missouri Avenue. Currently Texas Avenue is approximately 20 feet wide no dedicated bicycle or pedestrian facilities and a narrow shoulder. The proposed 6 foot sidewalks on one side of the street would provide a separate area for students to walk and bicycle to school.

H. Soft-surface Trail Improvement Alternative up O-A Hill

This proposed trail would formalize the existing demand paths that run up and down the west side of O-A Hill between Ora Bolmeier Park and the ends of North Street and A Street. This project would eliminate steeper routes, mitigate erosion issues, and consolidate the existing paths into a single-track trail following a moderate slope up O-A Hill, with a spur connecting to the north side of Bridge Street across from California Avenue.

Alternative H could have impacts to the Ora Bolmeier Park; however, the nature of the soft-surface pedestrian connection would allow the design to minimize environmental impacts.

I. Designate Cougar Street East of Rose Avenue as a Collector Street

Extend the existing Collector Street designation on Cougar Street east of Rose Avenue to Jefferson Avenue. Currently Cougar Street is only a collector on the west side of Rose Avenue. This project would change the designation of Cougar Street east of the highway to Jefferson Avenue. Collector Street standards would be applied to Cougar Street from 2nd Avenue to Jefferson Avenue.

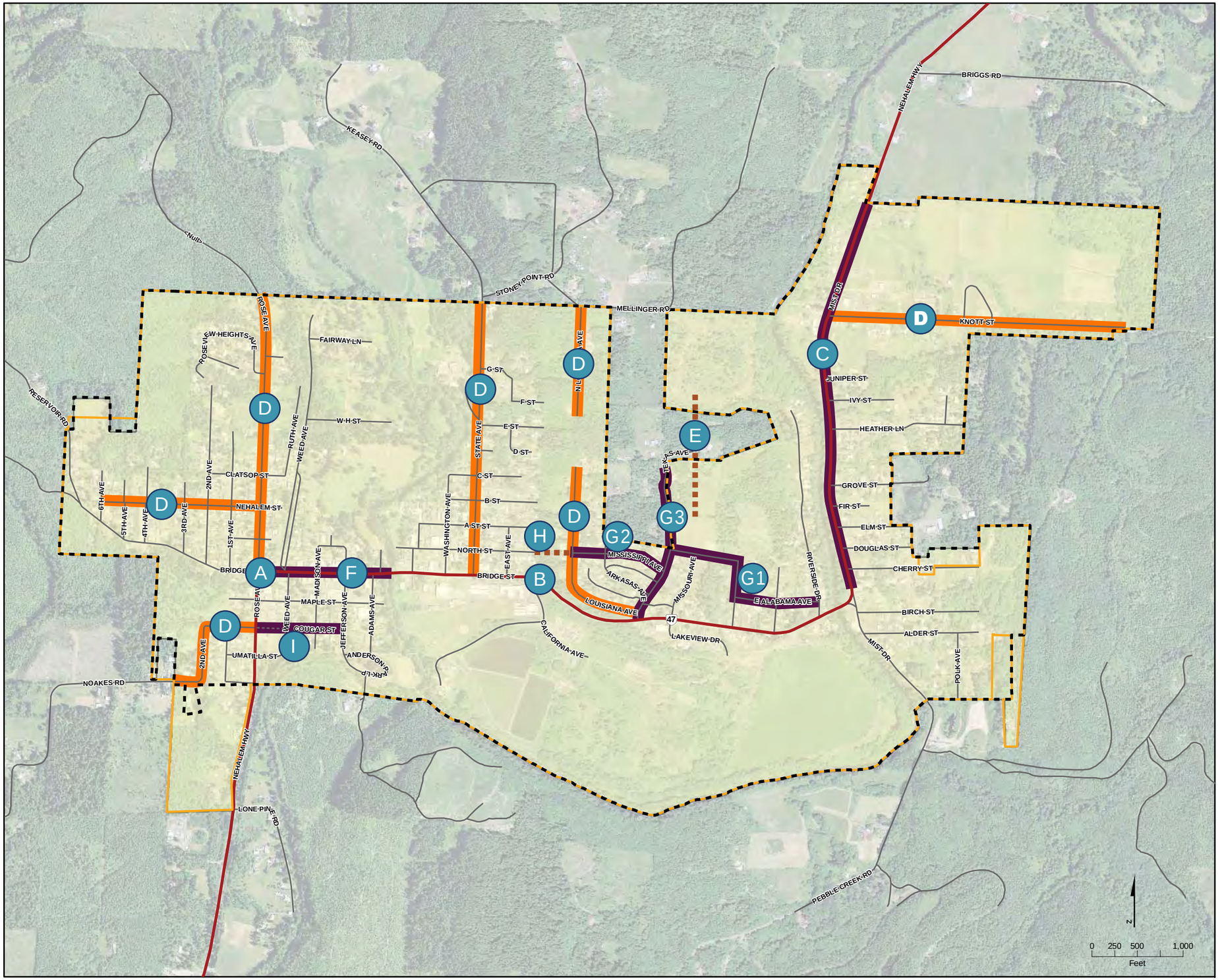
There are no anticipated environmental impacts or costs associated with this project. It is a designation change only.

Other Alternatives Considered

One high-cost alternative considered but not carried forward was a couplet for traffic in the downtown area, using Maple Street and linking Bridge Street near or on California Avenue. This alternative would require significant property acquisition for the connection to OR 47, and it would cross into floodplain and across a creek to the east and south of the old schools site. Because this alternative would have major changes to the circulation and parking in the downtown area and along Bridge and Maple Streets,

this alternative would be more appropriately and thoroughly considered as part of revisions to the Downtown Plan at a later date.

Table 2 lists the planning level cost estimates and potential funding sources for each alternative.



VICINITY MAP

LEGEND

- State Highway
- Streets
- City Limits
- Urban Growth Boundary
- Study Area
- Collector Streets
- A — Improve signage at OR47 and Rose Avenue.
- B — Improve pedestrian crossing at OR47 to access the side path on O-A Hill. Exact location to be determined.
- C — Add sidewalk along OR47/Mist Drive (east side).
- D — Add sidewalks or connect existing sidewalks along collector streets. Add bicycle facilities or shared lane markings.
- E — Add bicycle and pedestrian connection between new schools and future Nehalem View development. Exact location to be determined.
- F — Consider striping, longer curb bulb-outs, and/or bioswales to increase sight distance at corners in the downtown core.
- G — Safe routes to school connection improvements (on Alabama Avenue, Mississippi Avenue, and Texas Avenue)
- H — Soft-surface trail improvements up O-A Hill. Exact location to be determined.
- I — Extend Cougar East of Rose Avenue as a collector street

Low-Build (Short Term) Options

Vernonia Transportation System Plan

City of Vernonia, Oregon

This page intentionally left blank

TABLE 2
Summary of Low-Cost Alternatives
Cost Estimates and Potential Funding Sources

Letter	Alternative	Estimated Cost	Potential Funding	Comments
A	Improve signage at OR 47 and Rose Avenue	$10,000	ODOT Transportation Enhancements (TE)	
B	Improve Pedestrian Crossing on OR 47/Bridge Street to Access O-A Hill Sidepath	$50,000	Highway Safety Improvement Program; ODOT Statewide Transportation Improvement Program (STIP); ODOT Bicycle and Pedestrian Program; ODOT Transportation Enhancements (TE)	Cost estimate reflects 225' of 6' sidewalk with curb and gutter, two ADA-compliant curb ramps and crosswalk striping and signs.
C	Construct Sidewalk Along OR 47/Mist Drive	$750,000	ODOT Bicycle and Pedestrian Program; ODOT STIP; ODOT TE	Cost estimate reflects 4,600' of 6' sidewalk with curb and gutter.
D	Construct Sidewalks and Bicycle Facilities on Collector Streets	$5,480,000	Community Development Block Grant (CDBG); LID	Cost estimate reflects 29,800 feet of 6' sidewalk with curb and gutter, and 16,000 centerline feet of bike lanes in both directions (bike lanes assume existing adequate roadway width).
E	Bicycle/Pedestrian Connection From Vernonia Schools to Nehalem View Development	$210,000	Community Development Block Grant (CDBG); Developer Contribution; LID	Cost estimate reflects 1,300 feet of 12' shared-use path.
F	Bridge Street signing and Striping, potential bioswales, concrete bumps or curb bulb-out extensions	$13,000-$15,000 each corner	ODOT Transportation Enhancements (TE); Highway Safety Improvement Program; ODOT Bicycle and Pedestrian Program;	Estimates are for each individual corner to provide flexibility (bioswales vs. curb extension). Eleven corners on Bridge Street are assumed to need this treatment: The southeast and southwest corner of Bridge Street at Weed Avenue. All four corners at both Madison Avenue and Jefferson Avenue intersections with Bridge Street, and the southwest corner of Bridge Street and Adams Avenue.
G1	Safe Routes to School Connection – Alabama Avenue	$150,000	CDBG; LID	Cost estimate reflects 1,750 feet of 6' detached curbless sidewalk without drainage improvements.
G2	Safe Routes to School Connection – Mississippi Avenue	$110,000	CDBG; LID	Cost estimate reflects 1,200 feet of 6' detached curbless sidewalk without drainage improvements.
G3	Safe Routes to School Connection – Texas Avenue	$80,000	CDBG; LID	Cost estimate reflects 900 feet of 6' detached curbless sidewalk without drainage improvements.
H	Soft-Surface Trail Improvements up O-A Hill	$60,000	Oregon State Parks Recreational Trails Grant; Land and Water Conservation Fund; Urban Trails Fund; ODOT Transportation Enhancements (TE)	Cost estimate reflects 2,250 feet of soft surface trail in difficult terrain.
I	Designate Cougar Street East of Rose Avenue as a Collector Street	N/A		This changes the roadway designation, does not require any infrastructure improvements.

Note: Costs are planning-level. Funding is constrained or probable. Alternatives are generally short- and medium-term.

This page intentionally left blank

Street Design Standards

Existing Street Standards

There are no consistent street design standards for the City to use when new development is proposed within the City. The existing TSP has one set of standards, and the public works department has another. These standards are included in Attachment A. The TSP includes both urban and rural standards; a distinction that the PMT noted is a source of confusion and uncertainty for developers. The PMT suggested consolidating the standards and having a range of standards for collector and local streets depending on available width instead of maintaining the urban/rural distinction.

The rows highlighted in black with white text are the recommended standards. Some of the sidewalk and shared-use path standards are based on the existing right-of-way of the street: appropriate and flexible cross-sections are recommended to be consistent with the feel of the individual neighborhoods.

Current standards and the recommendations are as follows:

This page intentionally left blank

TABLE 3
Current City of Vernonia Roadway Standards
Public Works and 1999 TSP Standards Comparison

Standard Source	Local Road	Collector Road	Arterial Road
Public works Standards - Parking	2 parking lanes No parking within 30' of curb return	2 parking lanes When bike lanes are present, the city can prohibit parking No parking within 45' of the curb return	no parking lanes
TSP Standards - Urban Parking	New Local - 5' both sides Preferred Retrofit - 6' One side	8' one side	8' both sides
TSP Standards - Rural Parking	None	6' One side	None
Recommended Parking Standards	**None for minimum gravel cross-section 8' one side for 40' right-of-way 8' both sides for 47' right-of-way**	**8' both sides, all right-of-way widths**	**Downtown Core – 8' both sides None outside of the downtown core**
Public works Standards - Sidewalks	5' residential 5' (40' R/W residential) 6' Commercial/industrial	5' Residential 6' Commercial/Industrial	6'
TSP Standards - Urban Sidewalks	Preferred retrofit - 5' both sides Minimum retrofit - 5' one side	6' both sides	10' both sides (downtown), can be reduced to 6' both sides outside of downtown
TSP Standards - Rural Sidewalks	None	5' both sides	5' both sides
Recommended Sidewalk Standards	**11' shared-use path for 40' right-of-way Two 6' sidewalks for 47' right-of-way**	**8' shared-use path for 40' right-of-way 8' shared-use path and 6' sidewalk for 55' right-of-way**	**Minimum – 6' both sides Maximum – 12' both sides**
Public Works - Public street with a dedicated Bikeway	8'	8'	8'
TSP Standards - Urban Bikeways	None	5' both sides	5' both sides
TSP Standards - Rural Bikeways	None	5' both sides	5' both sides
Recommended Bikeway Standards	**None – See sidewalk standards for shared-use-path. On Local roads, bicyclists are assumed to be able to share the travel lane or use the shared-use path**	**None – See sidewalk standards for shared-use-path**	**6' both sides**
TSP Standards - Urban lanes	2 - 9'	2 - 10'	2 - 11'
TSP Standards - Rural lanes	2 - 9'	2 - 10'	2 - 12'
Recommended Lane widths	**2 – 8' for minimum gravel cross section 2 – 10' for 40' and 47' total right-of-way**	**2 – 10' for all right-of-way widths**	**2 – 12' travel lanes, and one 14' center turn lane**
TSP Standards - Total Pavement – Urban	28' - New local 24' Preferred Retrofit 18' Minimum Retrofit	38'	48'
TSP Standards - Total Pavement – Rural	18'	36'	24'
TSP Standards - Urban Unpaved Shoulders	5' both sides	None	None
TSP Standards - Rural Unpaved Shoulders	2' both sides	4' both sides	4' both sides
Recommended Shoulders	**2' for minimum gravel cross-section**	**None**	**None**

TABLE 3
Current City of Vernonia Roadway Standards
Public Works and 1999 TSP Standards Comparison

Standard Source	Local Road	Collector Road	Arterial Road
TSP Standards - Urban Planting Strip	New Local 5' both sides Preferred retrofit 5' both sides	5' both sides	None
Recommended Planting Strips	**None**	**6' Planter/Drainage for 50' right-of-way 8' Planter/Drainage for 55' right-of-way**	**Downtown core – 4' furniture zone, both sides. Can include street trees.**
TSP Standards - Urban ROW	New local - 50' Preferred Retrofit - 46' Minimum Retrofit - 25'	62'	70'
TSP Standards - Rural ROW	30'	62'	60'
Available ROW	**40' 47'**	**50' 55'**	**60' Minimum 75' Maximum**

Rows in Grey - Section 6.0000 – Streets City of Vernonia Public Works Design Standards
From City of Vernonia Transportation System Plan, July 1999
Rows in black – TSP Update Recommended Standards

Existing Local Street Right-of-Way Widths

Table 4 shows the approximate right-of-way widths platted for City streets. New streets and streets undergoing upgrades would need to comply with the appropriate street standards in the TSP.

The following right-right-of-way widths were provided from City records:

TABLE 4
City of Vernonia Local Street Widths

70'+	60'	50'	Less than 50'
Rose Avenue	A – I Streets	Idaho Avenue	Spencer Avenue
Weed Avenue (parts)	1st-3rd Streets	Alabama Avenue	All "tree streets" except Heather
	Washington Avenue	Texas Avenue	Riverside Drive
	Jefferson Avenue	Mississippi Avenue	Roseview Heights Avenue
	Madison Avenue	Arkansas Avenue	Cedar Street
	North Street	Louisiana Avenue – south segment	Ruth Avenue
	State Avenue	Fairway Lane	
	East Avenue	Heather Street	
	California Avenue	Columbia Street	
	Noakes Road /River Street	Nehalem Street	
	Umatilla Street	Clatsop Street	
	Cougar Street		
	Maple Street (parts)		
	Bridge Street (east of Rose)		
	Pebble Creek Road		
	Louisiana Avenue – north segment		
	Knott Street		

City of Vernonia, 2011, communication with City Planner, Carole Connell January 20, 2011.

Recommended Street Standards

The updated standards were presented at the Community Workshop and subsequently refined based on feedback gathered at the open house and Community Briefing. The proposed street standards to simplify and provide consistency throughout the City are as follows.

Arterial Roads (OR 47)

Currently, there are no operational issues, nor are there any future projected congestion or queuing issues on OR 47 through Vernonia. OR 47 starts as Rose Avenue from the southern city limits, continues along Bridge Street through most of downtown, and turns north along Mist Drive to the northern city limits. The highway is a two lane roadway through most of the City, with parallel parking on both sides through the downtown core (approximately Rose Avenue to the Rock Creek Bridge). The current cross section is adequate to serve existing and future needs. As part of the school relocation project, a turn lane will be added west of Missouri Avenue and extend almost back to the O-A Hill to provide an area for vehicles turning down Missouri Avenue to access the new school site.

The PMT suggested creating a cross section standard for OR 47 that includes a center two-way turn lane or a center median. This cross section would allow the City and State to require adequate right-of-way along the highway as development occurs and ensure that a center turn lane could be implemented as needed at a future date. A minimum (63-foot width) and maximum (75-foot width) three lane cross-section is shown in Figure 4.

A median was suggested by the PAC/PMT groups for the section of the highway along Rose Avenue in the southwest corner of the City. This would allow for traffic calming, provide a "gateway feature" to greet visitors coming to the City. The cross section would need to allow left turns at select cross-streets, and would be 14 feet in width.

Additionally, the Downtown cross-section was found in the Downtown Plan for Vernonia, and includes 8-foot parking on both sides, a 4-foot "street furniture" zone and a 6-foot sidewalk. It is recommended that these street standards are adopted in the TSP update so they are included in the City's Comprehensive Plan.

Collector Roads

Collector roads within Vernonia include Knott Street, Louisiana Avenue, State Avenue, Rose Avenue north of Bridge Street, Nehalem Street west of Rose Avenue, and Cougar Street connection to 2nd Avenue in the southwest part of the city. The right-of-way varies from 50 feet to 60+ feet throughout the city. The range of cross section opportunities and existing collector street widths is shown in Figure 5.

Collector roads have moderate traffic volumes and relatively low speeds (35 mph or slower) within Vernonia. The standards assume two travel lanes and a shared use path along one side that would accommodate bicyclists and pedestrians. Where the path is not separated from the travel lane by drainage or a planting strip, it would have a curb to ensure separation of the travel modes. Total right-of-way widths vary between 50 and 60 feet, and parking is recommended on both sides of the street. The wider cross section can accommodate both a shared use path and a planter on one side and a standard sidewalk on the other side of the street for a maximum of 55 feet. While the right of way may be wider than 55 feet on some collectors, feedback from the public and the Project Advisory Committee suggested that utilizing the entire width of the road would not be consistent of the feel of the community.

Local Roads

Local roads include all other roadways within Vernonia that are not described above. They generally are low volume, low speed facilities where bicycles are assumed to be able to share a lane. The local road cross sections include shared-use paths or sidewalks, have 10 foot travel lanes, and parking and drainage depending on available width. There is also a minimum gravel cross-section standard that is meant to provide flexibility for developers building a limited number of residences, and where the limited development may not justify a fully paved cross section. Further discussion of the number of residences served will be included in the policy language provided in the TSP update. Figure 6 shows recommended local street cross-sections.

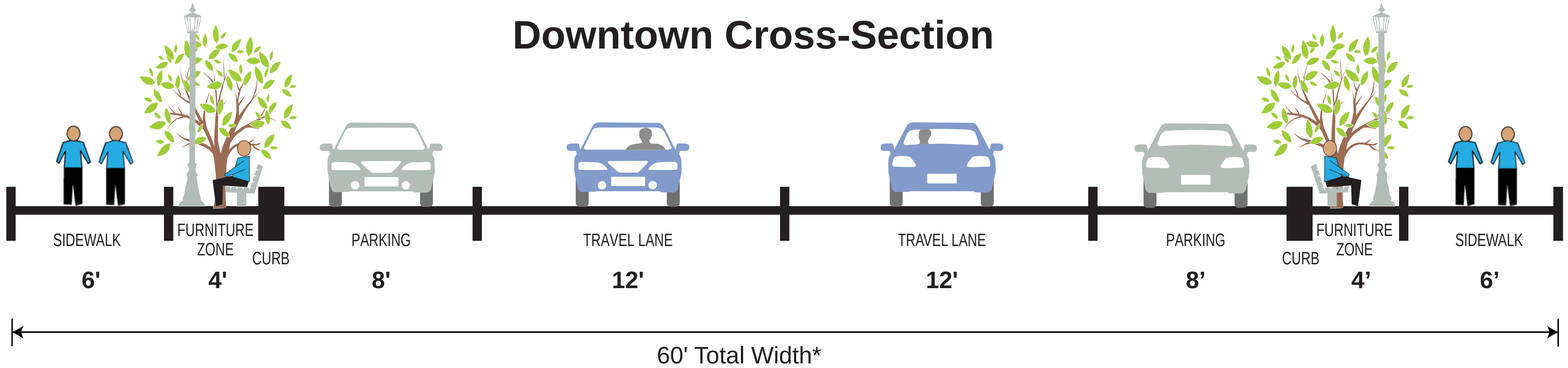
Next Steps

This draft Transportation System Solutions Report, the Safe Routes to New Schools Report, and the associated chapters in the TSP were reviewed by the Project Advisory Committee (PAC) and the Project Management Team (PMT). The recommended transportation package will be developed and prioritized with input from the PMT, the PAC, and the community. These reports and TSP chapters also will be the subject of two community briefings and two joint Planning Commission and City Council work sessions. This report will be revised to address issues and concerns prior to presentation to the Planning Commission and City Council for adoption. Public hearings will be held as part of the adoption process, as is appropriate for a TSP update and amendments to the City's Comprehensive Plan.

This page intentionally left blank

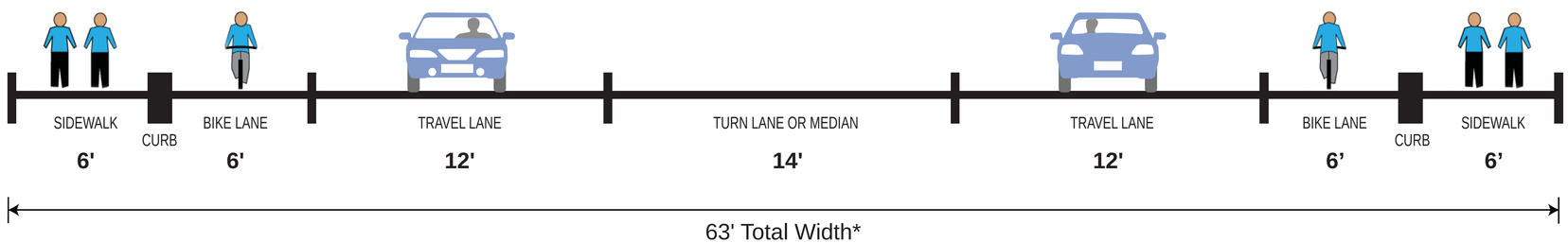
OR47 (Arterial Road) Range of Cross-Sections

Downtown Cross-Section



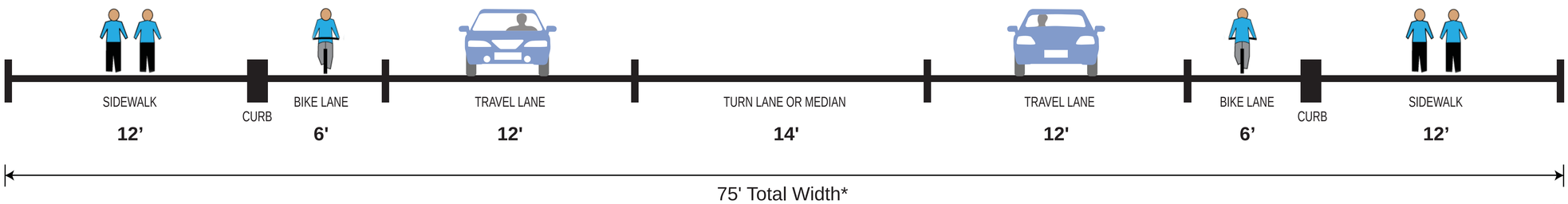
* 1' for curb

Minimum Cross-Section



* 1' for curb

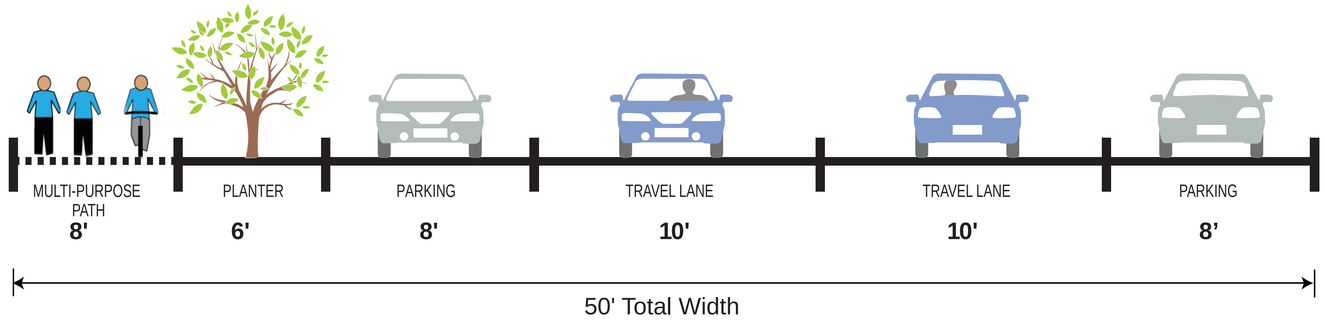
Maximum Cross-Section



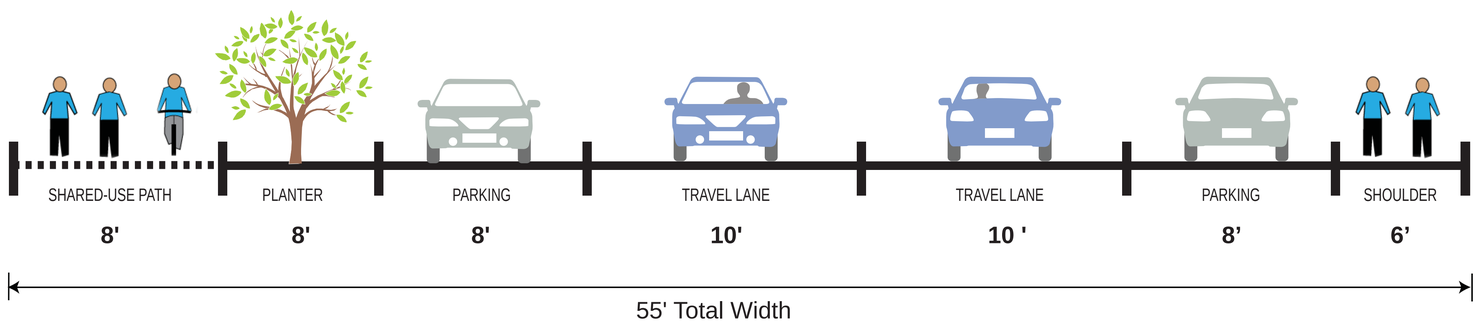
* 1' for curb

Range of Collector Road Cross-Sections

Minimum Cross-Section: Shared-Use Path on One Side



Maximum Cross-Section: Pedestrian Facilities and Parking on Both Sides

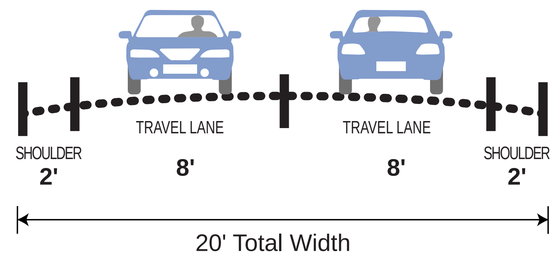


Collector Streets are:

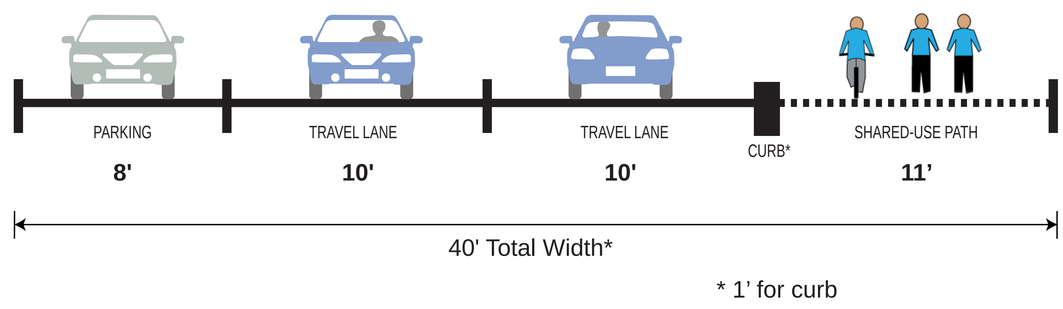
- Rose Ave (North of Bridge St), 75' ROW
- Nehalem St (West of Rose Ave), 50' ROW
- State Ave, 50' ROW
- Louisiana Ave (South Segment), 50' ROW
- Louisiana Ave (North Segment), 60' ROW
- Knott St, 60' ROW
- Cougar St (West of Rose Ave), 60' ROW

Range of Local Road Cross-Sections

Minimum Cross-Section: Gravel

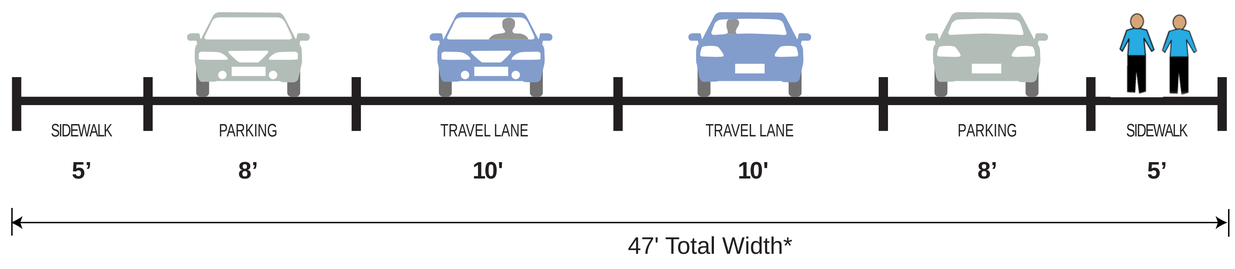


Intermediate Cross-Section: Shared Use Path with Curb, Parking One Side



NOTE:
On local streets, bicycles are assumed to be able to share the travel lane or the shared-use path.

Maximum Cross-Section: Sidewalk and Parking Both Sides



* Also an option for a wide path and planter on one side

This page intentionally left blank

NOTICE:

This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed, in part, by Federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), local government, and the State of Oregon funds.

The contents of this document do not necessarily reflect views or policies of the State of Oregon.

This page intentionally left blank

Attachment A: Existing City Street Design Standards

CITY OF VERNONIA
PUBLIC WORKS
DESIGN STANDARDS

SECTION 6.0000 - STREETS

6.0010 - GENERAL DESIGN REQUIREMENTS

Performance Standards - All street designs shall provide for the safe and efficient travel to the motoring public. Streets shall be designed to carry the recommended traffic volumes identified for each street classification. Street classifications are set forth in Section ***6.0110*** STREET SYSTEM DESCRIPTION AND FUNCTION.

Streets shall be designed to meet or exceed minimum guidelines. These guidelines are set forth in the "AASHTO Policy on Geometric Design of Highways and Streets" (latest edition). Traffic Control Devices shall conform to the "Manual on Uniform Traffic Control Devices for Streets and Highways," Federal Highway Administration, with Oregon Supplements, Oregon Dept. of Transportation's (latest edition).

All vertical and horizontal curves shall meet the guidelines of the AASHTO Policy and the design speed for each street classification. Where practical, the Design Engineer shall provide the desirable stopping sight distance set forth in the AASHTO Policy. But in no case shall it be less than the minimum stopping sight distance given be permitted.

Standard drawings relevant to this section may be found in the most current edition of the APWA Standard Specifications for Public Works Construction, Oregon Chapter.

6.0011 - RIGHT-OF-WAY AND PAVEMENT WIDTH

Right-of-way and minimum pavement widths for each street classification shall be as defined in City ordinances:

6.0012 - ACCESS

All development shall be provided public street access. Access roads - public and/or private, driveways, and easements shall be as set forth in other sections of these Design Standards.

6.0013 - TRAFFIC ANALYSIS

The Superintendent of Public Works will require a traffic analysis report as determined by the type of development and its potential impact to existing street systems. A traffic analysis may be required for a development 1) when it will generate 1,000 vehicle trips per weekday or more, or 2) when a development's location, proposed site plan, traffic characteristics could affect traffic safety, access management, street capacity, or known traffic problems or deficiencies in a development's study area.

The report will be prepared by a licensed traffic engineer in the State of Oregon. At a minimum, the report shall contain the following:

1. Purpose of Report and Study Objectives

   A discussion of key traffic issues to be addressed and the transportation system and development objectives related to a specific development.

   General transportation system objectives are:

   - to maintain easy and safe traffic flow on surrounding street system

- to provide effective and safe transfer of vehicle traffic between the site and the street system to provide convenient, safe and efficient on-site and off-site movement of vehicles, pedestrians, transit, service and delivery vehicles, and bicycle

- to effectively mitigate adverse site-generated traffic impacts on affected streets and intersections. Site-specific objectives may be established by the City for each study.

2. Executive Summary

A concise summary of the study purpose/objectives, site location and study area, development description, key assumptions, findings, conclusions and recommendations.

3. Description of Site and Study Area Roadways

A description of the site and study area, existing traffic conditions in the study area, and anticipated nearby development and committed roadway improvements which would affect future traffic in the study area.

The study area will be defined by:

All roads, ramps and intersections through which peak hour site traffic composes at least 5% of the existing capacity of an intersection approach, or roadway sections on which accident character or residential traffic character is expected to be significantly impacted.

On-site Traffic Evaluation

An evaluation of the proposed (and alternative) site access locations, the adequacy of access drive depth, driveway lanes, and queuing storage, the safety and efficiency of proposed vehicular circulation, parking layout, pedestrian and service vehicle routes/facilities, together with recommendations for on-site traffic markings and controls.

1. Technical Appendix

A technical appendix including work sheets, charts, traffic count, drawings to support findings as described in the body of the report.

2. Recommendations for Public Improvements

Recommendations should be made for external roadway improvements, such as additional through lanes and turn lanes, and traffic control devices necessitated as a result of the development. Recommended improvements to transit facilities, and pedestrian and bike circulation should also be reported.

The recommendations should specify the time period within which improvements should be made, particularly if improvements are associated with a phased development, the estimated cost of improvements, and any monitoring of operating conditions and improvements that may be needed. If needed street improvements, unrelated to the development, are identified during the analysis, such improvements should be reported.

3. Access Management

On sites with arterial and collector street frontages, the report shall evaluate and recommend the use of access management plans or techniques:

To separate basic conflict areas. Reduce number of driveways or increase spacing between driveways and intersections.

To remove turning vehicles or queues from the through lanes. (Reduce both the frequency and severity of conflicts by providing separate paths and storage area for turning vehicles and queues.) These techniques may include turn restrictions, striping, medians, frontage roads, channeling of lanes or driveways, shared driveways and access between similar uses, access consolidation, lanes for left or right turns, and other transportation system management (TSM) actions.

4. A review of alternative access points for site access to highways, city streets, and county roads.

5. The analysis of alternate access proposals should include:

a. Existing daily and P. M. peak hour counts, by traffic movements, at intersections effected by generated traffic from the development. (Use traffic flow diagrams).

b. Projected daily and P.M. peak hour volumes for these same intersections and proposed access points when the development is in full service. (Use traffic flow diagrams.)

c. A determination of the existing levels of service and projected levels of service at each intersection and access points stud-ed.

d. A discussion of the need for traffic signals. This should include a traffic warrant computation based on the National Manual on Uniform Traffic Control Devices.

1. The recommendations made in the report should be specific, and should be based on a minimum level of service when the development is in full service. As an example, if a traffic signal is recommended, the recommendation should include the type of traffic signal control and what movements should be signalized. If a storage lane for right turn or left turn is needed, the recommendation should include the amount of storage needed. If several intersections are involved for signalization, and an interconnect system is considered, specific analysis should be made concerning progression of traffic between intersections.

2. The report should include a discussion of bike and pedestrian usage and the facilities provided along with the availability of mass transit to serve the development, if appropriate.

6.0014 - INTERSECTIONS

Connecting street intersections: shall be located to provide for traffic flow, safety, and turning movements, as conditions warrant.

Arterial Intersections: Exclusive left and right turn lanes will be provided, bus turnouts will be provided if traffic flow and safety conditions warrant and designated crosswalks will be provided at controlled locations and street alignments across intersections shall be continuous.

Collector and Local Street Intersections: Street and intersection alignments should facilitate local circulation but avoid alignments that encourage non-local through traffic.

Streets shall be aligned so as to intersect at right angles (90°). Angles of less than 75° will not be permitted. Intersection of more than two streets at one point will not be permitted.

New streets shall intersect with existing street intersections so that centerline is not offset, except as provided below. Where existing streets adjacent to a proposed development do not align properly, conditions may be required of the development to provide for proper alignment.

For intersections which are not directly aligned with street centerline, the centerline spacing must meet the following minimum separation distance:

Street Class	Intersection Spacing (ft)
Arterial	500*
Collector	400*
Local	300*
Cul-de-sac	150

* The Superintendent of Public Works may permit a minimum spacing of not less than 300 feet (Arterial), 200 feet (Collector), 200 feet (Local), when findings are made to establish that:

a. Without the change, there could be no public street access from the parcel(s) to the existing street, and

b. All other provisions of the street design requirements can be met.

6.0015 - HALF-STREET CONSTRUCTION

Half-street construction is generally not acceptable. Where such a Street is justified, the right-of-way and pavement width will be approved by the Superintendent of Public Works. In no case shall the pavement width required be less than that required to provide two lanes of traffic to pass at a safe distance. For a 32-foot local street the half-street pavement width will be 20-feet. Half-streets will only be approved when the abutting or opposite frontage property is undeveloped and the full improvement will be provided with development of the abutting or opposite (upon right-of-way dedication) frontage property.
Half-street improvements shall include curb, sidewalk and storm drainage on one side of the street. When a half-street improvement is required, the entire street shall be designed

A development on an unimproved street shall be responsible for constructing a continuous City standard street to a connection with the nearest standard (publicly-maintained) street.

6.0016 - STREET CLASSIFICATION

All streets within the City shall be classified as listed in Section ***6.0110*** STREET SYSTEM DESCRIPTION AND FUNCTION. The classification for any street not listed shall be that determined by the Superintendent of Public Works.

6.0017 - DESIGN SPEED

Design speeds for classified streets shall be as follows:

Arterial	35-45 mph
Collector	30-40 mph
Local	25 mph
Cul-de-sac	25 mph

6.0020 - HORIZONTAL/VERTICAL CURVES, AND GRADES

6.0021 - HORIZONTAL CURVES

Horizontal curve radius (on centerline) for each street classification shall be designed according to the roadway design speed. The radius shall not be less than the following:

Arterial	415-600'
Collector	165-275'
Local	100'
Cul-de-sac	100'

6.0022 - VERTICAL CURVES

Vertical curve length shall be based on the design criteria which includes: (1) design speed, (2) crest vertical curve, and (3) sag vertical curve. Stopping sight distance for crest and sag vertical curves shall be based on sight distance and headlight sight distance, respectively.

All vertical curves shall be parabolic and the length shall be computed for each location.

6.0023 - GRADES

Maximum grades for each street classification shall be as follows:

Arterial	0.060 ft/ft
Collector	0.080 ft/ft
Local	0.100 ft/ft
Cul-de-sac	0.120 ft/ft

Local and cul-de-sac streets may exceed 12%, but in no case permitted to exceed 16%. The Superintendent of Public Works may approve a grade greater than 12% when all of the following conditions exist:

1. Topographic constraints do not allow the development to be served by a street with a maximum grade of 12% without causing de-stabilization of soils by excessive cuts and fills.

2. There is no access to the property being developed through adjacent properties at a maximum 12% grade.

3. The section of local street will not exceed a combination of length, horizontal alignment, and/or grades exceeding 12% which will create hazardous traffic conditions.

4. In no case shall the maximum street grade exceed 16%.

Minimum grade for all streets shall be 0.0050 feet per foot (0.50%) however, in all cases, street grades shall allow for proper and adequate drainage. Cul-de-sac "bulbs" shall have a minimum slope of 0.0060 feet per foot (0.60%).

Street cross-slopes shall be two (2) percent. Where there are site constraints the cross slope can vary from one (1) to three (3) percent.

6.0030 - PAVEMENT DESIGN

In general, all streets shall be constructed with asphaltic concrete type "C"; however, Portland Cement Concrete (PCC) streets are permitted as approved by the Superintendent of Public Works.

Typical flexible pavement thicknesses will be as shown in the. This will apply only to local streets and lower classifications.

The Engineer will provide a street structural design section for all roadways classified Neighborhood Collector and higher, and local streets in industrial zones. A structural design section will also be required when the soils report indicates poor soil.

6.0040 - CONCRETE CURB

All development projects will be required to construct street improvements with concrete curbs. Standard Curb shall only be used on streets classified Collector and lower when the longitudinal street grade is 0.10 feet per foot (1.0%) or greater. All others curbs and sidewalks shall be abutting. Monolithic Curb and Gutter shall be used on streets classified Collector and higher and when the longitudinal street grades less than 1.0%. Curb exposure for Standard Curb is seven (7) inches, and nine (9) inches at catch inlets. Curb exposure for monolithic curb and gutter shall be

six (6) inches, and eight (8) inches at catch insets. Joint spacing in curbs shall be 15-foot maximum for contraction joints and 45-foot maximum for expansion joints. In addition, expansion joints shall be located at all curb return Points and at driveway curb drop transition points.

A minimum of two drainage block-outs to accommodate 3" drain pipe shall be provided for each lot. Typically, these block-outs are located five feet (5') from each side property line.

6.0041 - CURB RETURN RADIUS

Curb return radius at street intersections shall be designed to accommodate all expected traffic. Minimum curb radius required shall be as follows:

Intersection	Radius
Local/Cul-de-sac with Local/Cul-de-sac	20'
Local/Cul-de-sac with Collector	20'
Local/Cul-de-sac with Collector or Arterial	30'
Collector with Collector or Arterial	30'
Collector/Arterial with Collector/Arterial	30'

Streets serving commercial/industrial properties may be required to install larger curb radius as required for vehicle movements.

6.0050 - PARKING

Street Class	Parking Lanes	Parking Required
Arterial	None	May be allowed in some areas
Collector	2	Variable (a)(b)
Local	2	Yes (c)(d)
Cul-de-sac	2	Yes (c)(d)

a. Where bike lanes exist on collectors, parking may be prohibited.

b. Collector - No parking within 45' of curb return.

c. Local - No parking within 30' of curb return.

d. Local Streets and Cul-de-sacs which are approved for reduced 40 feet right-of-way and 28 feet pavement, will be required to have one parking lane to assure that on-street parking is adequate for adjacent uses, a reduced street design will consider clustered parking bays adjacent to the street, if needed. Parking will not be allowed in a reduced radius cul-de-sac bulb.

For streets designated collector and below, the Superintendent of Public Works may consider design modifications to conserve major trees in the public right-of way. Subject to approval by the Superintendent of Public Works, parking lanes may be removed on one or on both sides of a street.

Design standards - parking and loading.

a. Scope.

1. These design standards shall apply to all parking, loading and maneuvering areas.

2. All parking and loading areas shall provide for the turning, maneuvering and parking of all vehicles in the lot.

6.0060 - SIDEWALKS

In general, new sidewalks are required for all development requiring a development permit.

Minimum Sidewalk Width

Street Class/Location	Includes 6" curb	
Arterial	6'	
Collector	5'	Residential
	6'	Commercial/Industrial
Local	5'	Residential
	5'	40' R/W - Residential
	6'	Commercial/Industrial
Cul-de-sac	5'	Residential
	5'	40' R/W - Residential
	5'	Commercial/Industrial

Sidewalks include a six inch curb as a portion of the minimum width. Sidewalks may be required to meander within the dedicated right-of-way or outside of the right-of-way within an easement with the approval of the Superintendent of Public Works.

For streets designated collector and below, the Superintendent of Public Works may consider design modifications to conserve major trees in the public right-of-way. Subject to approval by the Superintendent of Public Works, sidewalks may be deleted on one side of a street.

6.0061 - WHEELCHAIR RAMPS

Each corner at all intersections shall contain wheelchair ramps for handicapped access located within the curb return. Ramps shall also be located wherever an accessible route crosses a curb. In residential areas the ramp will be located at the midpoint of the curb return. On streets classified above local or cul-de-sac, ramps may be required at different locations within the curb return. It may also be required to construct two (2) ramps at a curb return when a different location is required.

Locations of sidewalk ramps shall be designed with regard to storm water flows, street grades, and pole locations. Other factors may also dictate sidewalk ramp location.

6.0070 - BIKEWAYS

This summarizes the City's policy and implementation strategies for bike ways within the City and for connection with metropolitan bike ways. The City's plan has adopted both AASHTO and ODOT standards and criteria as the minimum guidelines for bike way design, construction and control.

The City's adopted guidelines for bike ways consist of the following:

1. Guide for Development of New Bicycle Facilities 1981
2. AASHTO, Oregon Supplements and Exceptions to AASHTO Guide
3. Manual on Uniform Traffic Control Devices with Oregon supplements by Oregon Transportation Commission

b. Access.

1. Where a parking or loading area does not abut directly on a public street there shall be provided an unobstructed drive and not less than 20 feet in width for two-way traffic, leading to a public street, and traffic directions shall be plainly marked.

Parking area improvements. All public or private parking areas which contain three or more parking spaces and outdoor vehicle areas shall be improved according to the following.

a. All parking areas shall have durable, dust free surfacing of asphaltic concrete, Portland cement concrete or other approved materials. The design section shall conform to the use and the soils report. All parking areas, including those in conjunction with a single family or two-family dwelling, shall be graded so as not to drain excess storm water over the public sidewalk or onto any abutting public or private property.

b. All parking areas, except those required in conjunction with single family or two-family dwellings or vehicle sales areas, which abut a residential district, shall conform to the screening requirements as set forth in the city's site design ordinance.

c. All parking areas, except those required in conjunction with single family or two-family dwellings or vehicle sales areas may contain a maximum of 25% of the parking spaces sized for compact vehicles.

d. All required handicapped parking space shall conform to ORS 447.210 and shall be a minimum of 14 feet in width.

e. All parking areas, except those required with single family or two family dwellings or vehicle sales areas, shall have physically marked individual parking spaces such as painted lines, lettering, curbs and landscaping.

Table of Standards. The following table provides the minimum dimensions of parking stall's, length and width, aisle width and maneuvering space, of public or private parking areas. All parking facilities shall meet these minimum standards. The width of each parking space includes a four inch (4") wide stripe which separates each space. Compact spaces are noted in parenthesis:

Angel from Curb	Stall Width "A"	Channel Width "B"	Aisle Width "C"	Curb Length per stall "D"
Parallel	9' 0" (8'6")	9' 0" (8' 6")	12' 0" (12' 0")	23" 0" (20' 0")
30°	9' 0" (8'6")	16' 10" (14' 10")	12' 0" (12' 0")	18" 0" (17' 0")
45°	9' 0" (8'6")	19' 1" (16' 7")	14' 0" (14' 0")	12' 9" (12' 0")
60°	9' 0" (8'6")	20' 1" (17' 3")	18' 0" (18' 0")	10' 5" (10' 3")
90°	9' 0" (8'6")	18' 0" (15' 0")	24' 0" (24' 0")	9' 0" (8' 6")

Street lighting shall be provided as part of the street design process. Design illumination levels shall be in accordance with the recommendations if the "Illuminating Engineering Society" and are summarized in the following table.

RECOMMENDATIONS FOR ROADWAY AVERAGE
MAINTAIN ED HORIZONTAL ILLUMINATION

Roadway Classification	Commercial	Urban Intermediate	Residential
	Foot Candles		
Highway	1.4	1.2	1.0
Arterial	2.0	1.4	1.0
Collector	1.2	.9	.6
Local/Cul de sac	-	.9	.6

The average-to-minimum uniformity ratios for roadways in commercial and intermediate areas shall be 4:1 or better. In residential areas this uniformity ratio shall be 6:1 or better.

The street lighting system shall be provided using high pressure sodium vapor luminaries. The design average horizontal illumination and uniformity ratio shall be obtained by considering together the factors of lamp wattage, pole support spacing, maintaining height and luminaire of the street lights to locate poles at lot line extensions and not in the middle of a lot, and to locate poles at corners.

6.0092 - STREET NAMES AND TRAFFIC CONTROL

Street names for all new development will be approved by the City prior to recording of any maps or plats. The development shall pay for all street name and traffic control signage prior to the signing of the final plat or map by the City. All new Signage will be provided by the developer and installed by the City in new developments.

Street names shall conform with the established grid system(s) in the City and its UGB. No new street name shall be used which will duplicate or be confused with the name of existing streets in the UGB area.

Building numbering will be issued by the City of Vernonia.

6.0100 - MAILBOXES

Joint mailbox facilities shall be provided in all residential developments, with each joint mailbox serving at least two (2) dwelling units.

1. Joint mailbox structures shall be placed adjacent to roadway curbs.
2. Proposed locations of joint mailboxes shall be designated on as part of the development plan, and shall be approved by the Superintendent of Public Works.
3. Plans for the joint mailbox structure to be used shall be submitted as part of the development plan for approval by the Superintendent of Public Works.

6.0110 - STREET SYSTEM DESCRIPTION AND FUNCTION

6.0111 - GENERAL GUIDELINES

The urban boundary map, policies and access requirements for various land uses, as adopted by the Comprehensive Plan and Zoning Ordinance, shall serve as guidelines for the functional classifications, definitions and standards requirements and rules adopted under this chapter.

TABLE 6 - I
Driveway Widths (Min-Max)

Street Class.	Residential	Commercial	Industrial	No. Allowed
Arterial	12/24(2)	12/36	12/36	Res.-1/250' frontage Com.- 1/250' frontage
Collector	12/24(2)	12/36	12/36	Res.-1/frontage Com.- 1/frontage(5)
Local	12/24(2)	12/36	(4)	Res.-1/frontage(3) Com.-1/frontage
Cul-de-sac	12/24(2)	12/36	12/36	Res.-1/frontage(3) Com.- 1/frontage

Res. = Residential Zone Com.= Commercial Zone Ind.= Industrial Zone

Notes: (1) Special conditions may warrant access.
(2) 28' maximum with 3 car garage.
(3) Frontage greater than 130' permitted one additional curb cut.
(4) Build to Collector standard.
(5) Certain businesses may warrant one additional curb cut for service driveways.

TABLE 6 - 2
Driveway Locations (minimum distance to curb return)

Street Classification	Residential	Commercial	Industrial
Arterial	100' (1)(3)	100'	100'
Collector	45'(3)	100'	100'
Local	45'(2)	45'	45'
Cul-de-sac	45'(2)	45'	45'

Notes: (1) Minimum distance from curb return unless this prohibits access to the site.
(2) 25 feet will be allowed for corner lots with limited frontage where distance requirements cannot be met.
(3) Direct access to this street will not be allowed, if an alternative exists or is planned.

For classification of Collector and above, driveways adjacent to street intersections shall be located beyond the required queue length for traffic movements at the intersection. If this requirement prohibits access to the site, a driveway with restricted turn movements may be allowed.

Within commercial, industrial and multi-family areas shared driveways and internal access between similar uses are encouraged to reduce the access points to the higher classified roadways, to improve internal site circulation, and to reduce local trips or movements on the street system. Shared driveways or internal access between uses will be established by means of common access easements at the time of development.

Driveway grades shall not exceed twelve percent (12%) from the curb line to the property line.

6.0090 - STREET LIGHTING, NAMES AND SIGNAGE

6.0091 - STREET LIGHTING

A complete street lighting system shall be the responsibility of the development. All streets fronting the property shall be provided with adequate lighting. Developer is required to provide lighting for public convenience and safety. For lighting requirements, all developments will be required to submit three (3) copies of the final plat (residential and major land partitions) to the Superintendent of Public Works. Commercial and industrial developments, in addition to the above requirement, shall submit three (3) copies of the site plan to the Superintendent of Public Works.

6.0071 - BIKEWAY LOCATION, WIDTH

Bikeway Location	Minimum Width	Comments
Public Street (designated bike lane)	8' **	Each direction of travel
Public Street (non designated bike lane)		One way pavement width greater than 12' - desirable one way pavement width is 14' or greater
Off-Street Bicycle Path	5' *	One-Way Travel
Off-Street Bicycle Path	8'-10' *	Two-Way Travel
Off-Street Bicycle Path (Shared with Pedestrians)	12'*	Two-Way Travel
Off-Street Bicycle Path (Shared with Pedestrians)	7'*	One-Way Travel

* Paths are constructed with 2' gravel shoulders on both sides.

** An eight-foot section is required unless this width is not practical because of physical or economic constraints. A minimum width of four feet may be designated as a bicycle lane.

6.0072 - DESIGN CRITERIA

In general, bikeway design shall meet the adopted standards referred to in Section 6.0060.

All bike ways shall have a minimum crosses lope of two percent (2%) and a maximum cross-slope of five percent (5%). On curved alignments, the cross-slope shall be to the inside of the curve.

Bikeway curvature will be based on a minimum design speed of 20 mph. Bikeway grades shall be limited to a maximum of five percent (5%). Where topography dictates, grades over five percent (5%) are acceptable when a higher design speed is used and additional width is provided.

6.0073 - CONSTRUCTION

Off-street bike ways shall be constructed for two different situations. The two situations are: Where limited maintenance vehicle (City-owned) use will occur, and where heavy maintenance vehicle use will occur. In both cases, sub grade preparation will require removal of existing organic material and compaction.

Bikeway Thickness

Use	Asphalt	Aggregate
Limited	2"	6"
Heavy	3"	8"

When drainage, such as side ditches, is required parallel with the bike way, the ditch centerline shall be at least five feet (5') from the edge of the pavement. Ditch side slope adjacent to the bike way shall be no steeper than 2:1 when measuring the horizontal distance to the vertical distance.

When culverts cross bike ways, the ends of the pipe shall be no closer than five feet (5') from the edge of the bike way.

6.0074 - LIGHTING

Lighting should be included in the bikeway design when nighttime security could be a problem and a high nighttime use is expected (i.e., paths serving students, commuters). The horizontal illumination levels shall be .05 foot candle (5 lux) to 2 foot candles (22 lux) except when security problems exist. Higher illumination levels should be considered in these locations. The placement of the light standards (poles) shall meet all vertical and horizontal clearances.

6.0075 - DETERRING MOTOR VEHICLE USE

Bike paths intersecting with roadways require physical barriers to deter use by unauthorized motor vehicles. A lockable, removable post(s) may be used to discourage such use and still permit authorized vehicles to access the paths. The post shall be brilliantly colored and permanently reflectorized. If more than one (1) post is required, the spacing shall not exceed a separation of more than five (5) feet.

An alternative to deterring the motor vehicles is to design two (2) five (5) foot wide lanes separated by low landscaping at the intersection.

6.0080 - DRIVEWAYS

Access to private property shall be permitted with the use of driveway curb Cuts. The access points with the street shall be the minimum necessary to provide access while not inhibiting the safe circulation and carrying capacity of the street.

On Collector streets and above, one driveway per site frontage will be the normal maximum number. Double frontage lots and corner lots on these streets may be limited to access from a single street, usually the lower classification street. If additional driveways on a frontage are approved by the Superintendent of Public Works, a finding shall be made that no eminent traffic hazard would result and impacts on through traffic would be minimal restrictions may be imposed on additional driveways, such as limited turn movements, shared access between uses, closure of existing driveways, or other access management actions.

Driveway approach types, Residential Driveway, Commercial/Industrial Driveways, must be approved by the Superintendent of Public Works.

Should the length of a driveway be greater than fifty (50) feet in length and the driveway has only one (1) access to the street or does not loop to the street, a turnaround shall be provided. The minimum inside radius of the turn around shall be fifteen (15) feet with a width at the turnaround point of thirty (30) feet for maneuvering.

6.0112 - FUNCTIONAL CLASSIFICATIONS

Functional classification categorizes roads and streets by their operational purpose. Some of the key factors considered when adopting the functional classifications were the following:

a. Relation between street traffic and land use of the abutting properties;

b. Volume and kinds of traffic;

c. Relative origins and destinations of traffic and lengths of trips.

The basic hierarchy of functional classification is Arterial streets, Collector streets and Local/Cul-de-sac streets. These categories are defined as follows:

Arterial streets: Arterial streets carry higher volumes of traffic, usually over 4,000 vehicles/day and are generally consist of three or more lanes, with the third lane being a common turn lane. Their function is to serve intra-county trips; that is, trips which have at least one end trip within the county.

Collector streets: Collector streets gather area traffic from local streets within a one-half mile radius and connect it to the arterial system. They are not intended to serve through traffic, and they are the lowest order of streets designed to carry transient vehicles. Collector streets generally have a traffic volume rate of 1,000 to 4,000 vehicles/day. Abutting land uses are generally residential.

Local streets: Local streets provide access to abutting property and do not serve to move through traffic. Local streets standards will be further categorized by adjacent land use into residential, commercial and industrial local streets.

Local streets - (Commercial/Industrial): Within the local street classification, there may be considerable difference between the kind of improvement specified where commercial or industrial land uses access a local street, as compared to the kind of improvement specified for residential access. Generally, a local street classification in commercial or industrial areas will require an improvement equal to that specified for a collector classification.

Cul-de-sac streets: Cul-de-sac streets provide access to abutting property only and will be as short as possible, in no event shall a Cul-de-sac be more than 400' in length.

The length of a Cul-de-sac shall be measured along the centerline of the roadway from the near side of the intersecting street to the farthest point of the Cul-de-sac.
All Cul-e-sac streets shall terminate in a circular turnaround.

6.0120 - PERMANENT DEAD-END STREETS

A standard cul-de-sac turnaround shall be provided at the end of a permanent dead-end street that does not provide looped circulation. Permanent dead-end streets shall be limited to serving no more than twenty-five dwellings and shall not exceed six hundred feet in length from the point of the nearest centerline/centerline intersection.

A permanent dead-end street is measured from the right-of-way line at the nearest intersecting street, which has at least two points of access, to the right of way line at the furthest end of the dead-end street.

An existing dead-end street system which is more than 600 feet long or which serves more than 25 dwelling units may be terminated in a cul-de-sac if no Future Street Plan has been adopted and the following criteria are met:

a. Alternative emergency vehicle access or fire protection is provided satisfactory to the local Fire Authority and,

b. Neighborhood traffic circulation needs are not adversely impacted by the proposed cul-de-sac termination of the street.

Temporary dead-end streets more than one-hundred-fifty (150) feet in length shall be provided with an approved turn-around for emergency vehicles.

6.0130 - ALLEYWAYS AND PRIVATE RESIDENTIAL STREETS/ACCESS WAYS

6.0131 - ALLEYWAYS

Alleyways may be provided in commercial and industrial developments with approval by the Superintendent of Public Works. When approved, alleyways shall be dedicated to the city. The right of way width shall be 20 feet with a 20 foot pavement width.

Design for alleyways shall meet the same criteria as other public streets. The exceptions to those criteria may be centerline radius and design speed. Generally, alleyways shall be designed for one-way operations.

6.0132 - PRIVATE RESIDENTIAL ACCESS WAYS

In general, private residential streets and access ways shall be provided for multi-family developments such as condominiums and apartments. Interior design for private access ways in a manufactured home park shall meet standards for private residential access ways include:

1. Dead-end access ways shall not exceed 600 feet in length nor serve more than 25 dwellings units. Dead-end access ways which exceed 150 feet in length shall be provided with an approved turnaround.

2. "Private Street" Signage and driveway approach shall be placed at the intersection with the public street to clearly identify the private access way.

3. Private maintenance of the private streets/access ways shall be provided by a Homeowner's Association or other appropriate entity. Maintenance shall insure continual emergency access at all times.

4. Location of private access ways shall meet the Uniform Fire Code and meet the minimum pavement section of local residential streets.

5. Private residential access ways shall not be allowed in Manufactured Home Parks or Subdivisions.

6.0133 - PAVEMENT CUTS

Where pavement is installed next to existing pavement and at all trench cuts, the existing pavement shall be saw cut. The face of the joint between the new and existing pavement shall be coated with asphalt emulsion and the surface of the joint shall be sand sealed.

6.0134 - SHOULDERS

Where sidewalks and pavement end or where there is no curb and sidewalk (such as half-street improvements) shoulder rock shall be provided to grade with the pavement. Shoulder rock shall be a minimum of six (6") inches in depth, thirty six inches (36") wide and shall be 3/4-inch minus crushed.

TABLE 3-1.
PROPOSED ROADWAY DESIGN STANDARDS

Street Type	Travel Lanes	Parking	Bikeways	Total Pavement	Unpaved Shoulders	Planting Strip	Sidewalks	Right of Way[a]
Urban (Fig. 2-1)								
New Local	2 – 9'	5' both sides	—	28'	—	5' both sides	5' both sides	50'
Local Preferred Retrofit	2 – 9'	6' one side	—	24'	—	5' both sides	5' both sides	46'
Local Minimum Retrofit	2 – 9'	—	—	18'	—	—	5' one side	25'
Collector	2 – 10'	8' one side[a]	5' both sides	38'	—	5' both sides	6' both sides	62'
Arterial	2 – 11'	8' both sides[a]	5' both sides	48'	—	—	10' both sides[b]	70'
Rural (Fig. 2-1)								
Local	2 – 9'	—	—	18'	2' both sides	—	—	30'
Collector	2 – 10'	6' one side	5' both sides	36'	4' both sides	—	5' both sides	62'
Arterial	2 – 12'	—	5' both sides	34'	4' both sides	—	5' both sides	60'

a. Required right of way is the total of pavement, shoulders, planting strip, and sidewalks, plus 2 feet for urban roadways and 8 feet for rural roadways.
b. Standards for urban arterials and collectors require 8-foot parking lanes in the downtown area, where storefront commercial land uses make on-street parking desirable. The urban and rural standards application areas are defined by Figure 2-1. Outside of downtown, parking lanes may be excluded if adjacent land uses do not support the need (for instance, if buildings are set back from the right-of-way and have off-street parking). Where on-street parking is eliminated, total pavement width shall be reduced by the same amount.
c. The 10-foot arterial sidewalk is for the downtown area and may be reduced to 6 feet elsewhere.

ROADWAY OPERATIONS

Roadway Levels of Service

The 2018 traffic projections reflect a significant increase in traffic on Highway 47 through central Vernonia. The lack of a parallel east-west collector street on the north side of Vernonia forces traffic from the north to travel into downtown Vernonia and then backtrack to access new residential areas on the north side of the City. Also travel from residential

Attachment B: Cost Estimate Backing Sheets

CH2M HILL
SUMMARY - ORDER OF MAGNITUDE COST ESTIMATE SUMMARY

PROJECT:	Vernonia TSP	DATE:	SHEET:
DESIGN LEVEL:	Conceptual Level Estimates	2/23/2011	1 of 1

ALTERNATIVE	IMPROVEMENT	PROJECT COST	
HB-1	PROJECT: High Build #1 - Widen OR 47	$	8,831,000
HB-2	PROJECT: High Build #2 - California Bike/Ped Improvements	$	450,000
HB-3	PROJECT: High Build #3 - New Bike/Ped Bridge	$	1,689,000
HB-5	PROJECT: High Build #5 - Mist Drive Intersection Improvements	$	369,000
HB-7a	PROJECT: High Build #7a - North/South Shared Use Path	$	452,000
HB-7b	PROJECT: High Build #7b - E/W Industrial Connector	$	2,647,000
HB-7c	PROJECT: High Build #7c - Louisiana Connection	$	358,000
HB-7d	PROJECT: High Build #7d - Texas Avenue Extension	$	1,445,000
LB-A	PROJECT: Low Build A - OR 47 @ Rose Signing	$	10,000
LB-Fa	PROJECT: Low Build G - Bridge Street Curb Extension	$	13,000
LB-Fb	PROJECT: Low Build G - Bridge Street Bioswale	$	15,000

CH2M HILL - ORDER OF MAGNITUDE ESTIMATE
City of Vernonia Transportation System Plan

PROJECT: High Build #1 - Widen OR 47	**PREPARED BY: Darren Hippenstiel**	**DATE: 03/02/2011**
DESIGN LEVEL: Planning Level		
KIND OF WORK: Roadway, Walls, Earthwork, Drainage	**LENGTH (MILE):** 0.34	**SHEET:** 1 of 1

NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Curb, Gutter, Sidewalks & Drainage	Mi.	0.34	$1,230,200.00	$418,268
2	Shared Use Path	Mi.		$187,800.00	$0
3	New Roadway - State Highway	Lane-Mi.	0.44	$457,100.00	$201,124
4	Overlay Existing Roadway	Lane-Mi.	0.57	$91,900.00	$52,383
5	Reconstruct Existing Roadway	Lane-Mi.		$304,900.00	$0
6	Intersection Widening	EA		$75,400.00	$0
7	Large Roundabouts	EA		$1,100,000.00	$0
8	Small Roundabouts	EA		$400,000.00	$0
9	Interconnect Signal	LS		$35,000.00	$0
10	New Signal	EA		$300,000.00	$0
11	Signal Modifications	EA		$65,000.00	$0
12	Earthwork (See Note)	CY	6,250	$30.00	$187,500
13	Traffic Calming	5-10%		-	$0
14	Illumination	Mi.	0.34	$338,000.00	$114,920
15	Landscaping	Mi.		$235,000.00	$0
16	Bridges	SF		$150.00	$0
17	Barrier	LF	1,200	$1,750.00	$2,100,000
18	Walls	SF	9,050	$150.00	$1,357,500
			SUBTOTAL		***$4,431,695***

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		$88,600
	TP & DT	3.0-8.0%	8.0%		$354,500
	Mobilization	8.0-10.0%	10.0%		$443,200
	Erosion Control	0.5-2.0%	2.0%		$88,600
	Contingency	30-40%	40.0%		$1,772,700
	Escalation (per year)	0.5-2.0%	2.0%		$0
	Estimate Year		2011		
	Construction Year		2011		
			TOTAL CONSTRUCTION COST		***$7,179,295***

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		$933,300
	Construction Engineering	10.0%	10.0%		$717,900
			TOTAL PROJECT COST		**$8,831,000**

Notes:

Existing Roadway Width - 34'; 12' lanes, 10' shared use shoulder
Proposed roadway width - 49'; 12' lanes, 6' bikes, 6.5' sidewalk (.5' curb)
Widening is to north side only. Existing retaining wall is repaired/maintained and retrofit with concrete barrier
5' average height cut wall north (L=1,150')
10' average height (15' width) cut north
Illumination inlcuded along corridor improvements
Cost associated for right-of-way and environmental documentation are not included

CH2M HILL - ORDER OF MAGNITUDE ESTIMATE
City of Vernonia Transportation System Plan

PROJECT: High Build #2 - California Bike/Ped Improvements	**PREPARED BY: Darren Hippenstiel**	**DATE: 03/02/2011**
DESIGN LEVEL: Planning Level		
KIND OF WORK: Roadway, Earthwork, Drainage	**LENGTH (MILE):** 0.22	**SHEET:** 1 of 1

NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Sidewalk & Drainage	Mi.		$1,198,100.00	$0
2	Shared Use Path	Mi.		$187,800.00	$0
3	New Roadway - Local Roads	Lane-Mi.	0.22	$269,700.00	$59,334
4	Overlay Existing Roadway	Lane-Mi.		$91,900.00	$0
5	Reconstruct Existing Roadway	Lane-Mi.		$304,900.00	$0
6	Intersection Widening	EA		$75,400.00	$0
7	Large Roundabouts	EA		$1,100,000.00	$0
8	Small Roundabouts	EA		$400,000.00	$0
9	Interconnect Signal	LS		$35,000.00	$0
10	New Signal	EA		$300,000.00	$0
11	Signal Modifications	EA		$65,000.00	$0
12	Earthwork (See Note)	CY	1,533	$30.00	$45,990
13	Traffic Calming	5-10%		-	$0
14	Illumination	Mi.	0.22	$338,000.00	$74,360
15	Landscaping	Mi.	0.22	$235,000.00	$51,700
16	Bridges	SF		$150.00	$0
17	Walls	SF		$55.00	$0
			SUBTOTAL		***$231,384***

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		$4,600
	TP & DT	3.0-8.0%	4.0%		$9,300
	Mobilization	8.0-10.0%	10.0%		$23,100
	Erosion Control	0.5-2.0%	2.0%		$4,600
	Contingency	30-40%	40.0%		$92,600
	Escalation (per year)	0.5-2.0%	2.0%		$0
	Estimate Year		2011		
	Construction Year		2011		
			TOTAL CONSTRUCTION COST		***$365,584***

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		$47,500
	Construction Engineering	10.0%	10.0%		$36,600
			TOTAL PROJECT COST		**$450,000**

Notes:

Proposed 12' width shared use path, 2" AC/10" Agg base
Improvement limits from the west beginning of California to Missouri Intersection
2' average height earthwork
Illumination and landscaping inlcuded along corridor improvements
Cost associated for right-of-way and environmental documentation are not included

CH2M HILL - ORDER OF MAGNITUDE ESTIMATE
City of Vernonia Transportation System Plan

PROJECT: High Build #3 - New Bike/Ped Bridge	**PREPARED BY: Darren Hippenstiel**	**DATE: 03/02/2011**
DESIGN LEVEL: Planning Level		
KIND OF WORK: Roadway, Walls, Earthwork, Drainage, Structures	**LENGTH (MILE):** 0.10	**SHEET:** 1 of 1

NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Curb, Gutter, Sidewalks & Drainage	Mi.		$1,230,200.00	$0
2	Shared Use Path	Mi.	0.07	$187,800.00	$13,146
3	New Roadway - State Highway	Lane-Mi.		$457,100.00	$0
4	Overlay Existing Roadway	Lane-Mi.		$91,900.00	$0
5	Reconstruct Existing Roadway	Lane-Mi.		$304,900.00	$0
6	Intersection Widening	EA		$75,400.00	$0
7	Large Roundabouts	EA		$1,100,000.00	$0
8	Small Roundabouts	EA		$400,000.00	$0
9	Interconnect Signal	LS		$35,000.00	$0
10	New Signal	EA		$300,000.00	$0
11	Signal Modifications	EA		$65,000.00	$0
12	Earthwork (See Note)	CY	1,750	$30.00	$52,500
13	Traffic Calming	5-10%		-	$0
14	Illumination	Mi.	0.10	$338,000.00	$33,800
15	Landscaping	Mi.	0.10	$235,000.00	$23,500
16	Bridges	SF	3,000	$225.00	$675,000
17	Walls	SF	900	$55.00	$49,500
			SUBTOTAL		***$847,446***

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		$16,900
	TP & DT	3.0-8.0%	8.0%		$67,800
	Mobilization	8.0-10.0%	10.0%		$84,700
	Erosion Control	0.5-2.0%	2.0%		$16,900
	Contingency	30-40%	40.0%		$339,000
	Escalation (per year)	0.5-2.0%	2.0%		$0
	Estimate Year		2011		
	Construction Year		2011		
			TOTAL CONSTRUCTION COST		***$1,372,746***

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		$178,500
	Construction Engineering	10.0%	10.0%		$137,300
			TOTAL PROJECT COST		**$1,689,000**

Notes:

Proposed 12' width shared use path, 2" AC/10" Agg base; length of improvements 550' (350' path)
200' length clear span, 15' wide bridge (12' path, 1.5' rails)
Concrete girder type bridge assumed.
5' average height fill and wing walls at bridge approaches
5' average height fill approaching bridge
Illumination included along corridor improvements
Cost associated for right-of-way and environmental documentation are not included

CH2M HILL - ORDER OF MAGNITUDE ESTIMATE
City of Vernonia Transportation System Plan

PROJECT: High Build #5 - Mist Drive Intersection Improvements	**PREPARED BY: Darren Hippenstiel**	**DATE: 03/02/2011**
DESIGN LEVEL: Planning Level		
KIND OF WORK: Roadway, Drainage	**LENGTH (MILE):** 0.04	**SHEET:** 1 of 1

NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Curb, Gutter, Sidewalks & Drainage	Mi.	0.04	$1,216,700.00	$48,668
2	Shared Use Path	Mi.		$187,800.00	$0
3	New Roadway - Collector	Lane-Mi.	0.14	$339,100.00	$47,474
4	Overlay Existing Roadway	Lane-Mi.		$91,900.00	$0
5	Reconstruct Existing Roadway	Lane-Mi.		$304,900.00	$0
6	Intersection Widening	EA	1	$75,400.00	$75,400
7	Large Roundabouts	EA		$1,100,000.00	$0
8	Small Roundabouts	EA		$400,000.00	$0
9	Interconnect Signal	LS		$35,000.00	$0
10	New Signal	EA		$300,000.00	$0
11	Signal Modifications	EA		$65,000.00	$0
12	Earthwork (See Note)	CY		$30.00	$0
13	Traffic Calming	5-10%		-	$0
14	Illumination	Mi.	0.04	$338,000.00	$13,520
15	Landscaping	Mi.		$235,000.00	$0
16	Bridges	SF		$200.00	$0
17	Walls	SF		$55.00	$0
			SUBTOTAL		***$185,062***

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		$3,700
	TP & DT	3.0-8.0%	8.0%		$14,800
	Mobilization	8.0-10.0%	10.0%		$18,500
	Erosion Control	0.5-2.0%	2.0%		$3,700
	Contingency	30-40%	40.0%		$74,000
	Escalation (per year)	0.5-2.0%	2.0%		$0
	Estimate Year		2011		
	Construction Year		2011		
			TOTAL CONSTRUCTION COST		***$299,762***

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		$39,000
	Construction Engineering	10.0%	10.0%		$30,000
			TOTAL PROJECT COST		**$369,000**

Notes:

Improvements consolidate intersection of Mist Dr. and OR47 to one location
Roadway approaches widened along OR47 for SB left turn lane to Mist Drive
200' reconstruction along Mist Dr, width 50'; 11' lanes, 8' swale, 8' parking, 12' shared use

CH2M HILL - ORDER OF MAGNITUDE ESTIMATE
City of Vernonia Transportation System Plan

PROJECT: High Build #7a - North/South Shared Use Path	**PREPARED BY: Darren Hippenstiel**	**DATE: 03/02/2011**
DESIGN LEVEL: Planning Level		
KIND OF WORK: Roadway, Drainage	**LENGTH (MILE):** 0.66	**SHEET:** 1 of 1

NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Sidewalk & Drainage	Mi.		$875,600.00	$0
2	Shared Use Path	Mi.	0.7	$187,800.00	$123,948
3	New Roadway - Local Roads	Lane-Mi.		$269,700.00	$0
4	Overlay Existing Roadway	Lane-Mi.		$91,900.00	$0
5	Reconstruct Existing Roadway	Lane-Mi.		$304,900.00	$0
6	Intersection Widening	EA		$75,400.00	$0
7	Large Roundabouts	EA		$1,100,000.00	$0
8	Small Roundabouts	EA		$400,000.00	$0
9	Interconnect Signal	LS		$35,000.00	$0
10	New Signal	EA		$300,000.00	$0
11	Signal Modifications	EA		$65,000.00	$0
12	Earthwork (See Note)	CY	1,950	$30.00	$58,500
13	Traffic Calming	5-10%		-	$0
14	Illumination	Mi.		$338,000.00	$0
15	Landscaping	Mi.		$235,000.00	$0
16	Bridges	SF		$150.00	$0
17	Walls	SF		$55.00	$0
18	Wetland Mitigation	LS	1	$50,000.00	$50,000
				SUBTOTAL	***$232,448***

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		$4,600
	TP & DT	3.0-8.0%	4.0%		$9,300
	Mobilization	8.0-10.0%	10.0%		$23,200
	Erosion Control	0.5-2.0%	2.0%		$4,600
	Contingency	30-40%	40.0%		$93,000
	Escalation (per year)	0.5-2.0%	2.0%		$0
	Estimate Year		2011		
	Construction Year		2011		
			TOTAL CONSTRUCTION COST		***$367,148***

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		$47,700
	Construction Engineering	10.0%	10.0%		$36,700
			TOTAL PROJECT COST		**$452,000**

Notes:

Proposed 12' width shared use path, 2" AC/10" Agg base
1' earthwork assumed for fill/cut/stabilization
Illumination and landscaping not inlcuded along corridor improvements
Reduced TP&DT for off-alignment work
Alignment crosses wetlands, mitigation assumed
Cost associated for right-of-way and environmental documentation are not included

CH2M HILL - ORDER OF MAGNITUDE ESTIMATE
City of Vernonia Transportation System Plan

PROJECT: High Build #7b - E/W Industrial Connector	**PREPARED BY: Darren Hippenstiel**	**DATE: 03/02/2011**
DESIGN LEVEL: Planning Level		
KIND OF WORK: Roadway, Drainage	**LENGTH (MILE):** 0.47	**SHEET:** 1 of 1

NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Sidewalk & Drainage	Mi.	0.47	$875,600.00	$411,532
2	Shared Use Path	Mi.		$187,800.00	$0
3	New Roadway - State Highway	Lane-Mi.	1.49	$457,100.00	$681,079
4	Overlay Existing Roadway	Lane-Mi.		$91,900.00	$0
5	Reconstruct Existing Roadway	Lane-Mi.		$304,900.00	$0
6	Intersection Widening	EA		$75,400.00	$0
7	Large Roundabouts	EA		$1,100,000.00	$0
8	Small Roundabouts	EA		$400,000.00	$0
9	Interconnect Signal	LS		$35,000.00	$0
10	New Signal	EA		$300,000.00	$0
11	Signal Modifications	EA		$65,000.00	$0
12	Earthwork (See Note)	CY		$30.00	$0
13	Traffic Calming	5-10%		-	$0
14	Illumination	Mi.	0.47	$338,000.00	$158,860
15	Landscaping	Mi.	0.47	$235,000.00	$110,450
16	Bridges	SF		$150.00	$0
17	Walls	SF		$55.00	$0
			SUBTOTAL		***$1,361,921***

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		$27,200
	TP & DT	3.0-8.0%	4.0%		$54,500
	Mobilization	8.0-10.0%	10.0%		$136,200
	Erosion Control	0.5-2.0%	2.0%		$27,200
	Contingency	30-40%	40.0%		$544,800
	Escalation (per year)	0.5-2.0%	2.0%		$0
	Estimate Year		2011		
	Construction Year		2011		
			TOTAL CONSTRUCTION COST		***$2,151,821***

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		$279,700
	Construction Engineering	10.0%	10.0%		$215,200
			TOTAL PROJECT COST		**$2,647,000**

Notes:

Roadway is new alignment east/west collector to future indistrial connection to Knott Rd.
Proposed roadway width - 60'; 12' lanes, 8' parking, 14' shared use (no curb), 6' shoulder
Use state pavement section industrial area
Improvements are at grade with negligible cut/fill
Illumination and landscaping inlcuded along corridor improvements
Reduced TP&DT for off-alignment work
Cost associated for right-of-way and environmental documentation are not included

CH2M HILL - ORDER OF MAGNITUDE ESTIMATE
City of Vernonia Transportation System Plan

PROJECT: High Build #7c - Louisiana Connection	**PREPARED BY: Darren Hippenstiel**	**DATE: 03/02/2011**
DESIGN LEVEL: Planning Level		
KIND OF WORK: Roadway, Drainage	**LENGTH (MILE):** 0.10	**SHEET:** 1 of 1

NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Sidewalk & Drainage	Mi.	0.10	$956,200.00	$95,620
2	Shared Use Path	Mi.		$187,800.00	$0
3	New Roadway - Local Roads	Lane-Mi.	0.23	$269,700.00	$62,031
4	Overlay Existing Roadway	Lane-Mi.		$91,900.00	$0
5	Reconstruct Existing Roadway	Lane-Mi.		$304,900.00	$0
6	Intersection Widening	EA		$75,400.00	$0
7	Large Roundabouts	EA		$1,100,000.00	$0
8	Small Roundabouts	EA		$400,000.00	$0
9	Interconnect Signal	LS		$35,000.00	$0
10	New Signal	EA		$300,000.00	$0
11	Signal Modifications	EA		$65,000.00	$0
12	Earthwork (See Note)	CY	880	$30.00	$26,400
13	Traffic Calming	5-10%		-	$0
14	Illumination	Mi.		$338,000.00	$0
15	Landscaping	Mi.		$235,000.00	$0
16	Bridges	SF		$150.00	$0
17	Walls	SF		$55.00	$0
			SUBTOTAL		***$184,051***

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		$3,700
	TP & DT	3.0-8.0%	4.0%		$7,400
	Mobilization	8.0-10.0%	10.0%		$18,400
	Erosion Control	0.5-2.0%	2.0%		$3,700
	Contingency	30-40%	40.0%		$73,600
	Escalation (per year)	0.5-2.0%	2.0%		$0
	Estimate Year		2011		
	Construction Year		2011		
			TOTAL CONSTRUCTION COST		***$290,851***

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		$37,800
	Construction Engineering	10.0%	10.0%		$29,100
			TOTAL PROJECT COST		**$358,000**

Notes:

Roadway utilizes existing graded north/south connection
Proposed roadway width - 40'; 10' lanes, 8' parking, 11' shared use
Roadway section assumes full reconstruction
1' average earthwork assumed for widening and grading
No illumination or landscaping
Reduced TP&DT for off-alignment work
Cost associated for right-of-way and environmental documentation are not included

CH2M HILL - ORDER OF MAGNITUDE ESTIMATE
City of Vernonia Transportation System Plan

PROJECT: High Build #7d - Texas Avenue Extension	**PREPARED BY: Darren Hippenstiel**	**DATE: 03/02/2011**
DESIGN LEVEL: Planning Level		
KIND OF WORK: Roadway, Drainage	**LENGTH (MILE):** 0.31	**SHEET:** 1 of 1

NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Sidewalk & Drainage	Mi.	0.31	$1,198,100.00	$371,411
2	Shared Use Path	Mi.		$187,800.00	$0
3	New Roadway - Local Roads	Lane-Mi.	0.72	$269,700.00	$194,184
4	Overlay Existing Roadway	Lane-Mi.		$91,900.00	$0
5	Reconstruct Existing Roadway	Lane-Mi.		$304,900.00	$0
6	Intersection Widening	EA		$75,400.00	$0
7	Large Roundabouts	EA		$1,100,000.00	$0
8	Small Roundabouts	EA		$400,000.00	$0
9	Interconnect Signal	LS		$35,000.00	$0
10	New Signal	EA		$300,000.00	$0
11	Signal Modifications	EA		$65,000.00	$0
12	Earthwork (See Note)	CY		$30.00	$0
13	Traffic Calming	5-10%		-	$0
14	Illumination	Mi.	0.31	$338,000.00	$104,780
15	Landscaping	Mi.	0.31	$235,000.00	$72,850
16	Bridges	SF		$70.00	$0
17	Walls	SF		$55.00	$0
			SUBTOTAL		***$743,225***

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		$14,900
	TP & DT	3.0-8.0%	4.0%		$29,700
	Mobilization	8.0-10.0%	10.0%		$74,300
	Erosion Control	0.5-2.0%	2.0%		$14,900
	Contingency	30-40%	40.0%		$297,300
	Escalation (per year)	0.5-2.0%	2.0%		$0
	Estimate Year		2011		
	Construction Year		2011		
			TOTAL CONSTRUCTION COST		***$1,174,325***

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		$152,700
	Construction Engineering	10.0%	10.0%		$117,400
			TOTAL PROJECT COST		**$1,445,000**

Notes:

Roadway is new north extension of Texas Avenue
Proposed roadway width - 60'; 10' lanes, 8' parking/swale both sides, 12' shared use both sides
Improvements are at grade, earthowrk is negligible
Illumination and landscaping inlcuded along corridor improvements
Reduced TP&DT for off-alignment work
Cost associated for right-of-way and environmental documentation are not included

CH2M HILL - ORDER OF MAGNITUDE ESTIMATE
City of Vernonia Transportation System Plan

PROJECT: Low Build A - OR 47 @ Rose Signing	**PREPARED BY: Darren Hippenstiel**	**DATE: 03/02/2011**
DESIGN LEVEL: Planning Level		
KIND OF WORK: Signing	**LENGTH (MILE):**	**SHEET:** 1 of 1

NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Signs	SF	100	$25.00	$2,500
2	Posts	Foot Board	90.0	$7.00	$630
			SUBTOTAL		***$3,130***

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		$1,000
	TP & DT	3.0-8.0%	4.0%		$1,000
	Mobilization	8.0-10.0%	10.0%		$1,000
	Erosion Control	0.5-2.0%	2.0%		$0
	Contingency	30-40%	40.0%		$1,300
	Escalation (per year)	0.5-2.0%	2.0%		$0
	Estimate Year		2011		
	Construction Year		2011		
			TOTAL CONSTRUCTION COST		***$7,430***

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		$1,000
	Construction Engineering	10.0%	10.0%		$700
			TOTAL PROJECT COST		**$10,000**

Notes:

New signage at OR 47 and Rose Avenue intersection

Assumes 5 total signs with new wood posts

CH2M HILL - ORDER OF MAGNITUDE ESTIMATE
City of Vernonia Transportation System Plan

PROJECT: Low Build F - Bridge Street Curb Extension	**PREPARED BY: Darren Hippenstiel**	**DATE: 03/03/2011**
DESIGN LEVEL: Planning Level		
KIND OF WORK: Signing and Striping	**LENGTH (MILE):**	**SHEET:** 1 of 1

NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Signs	SF	1.5	$25.00	$38
2	Posts	Foot Board	18	$7.00	$126
3	Curb	LF	28	$15.00	$420
4	Sidewalk	SF	160	$5.00	$800
5	Inlet/Cath Basin	EA	1	$1,500.00	$1,500
6	12 Inch Storm Sewer Pipe, 5' deep	LF	20	$80.00	$1,600
			SUBTOTAL		***$4,484***

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		$1,000
	TP & DT	3.0-8.0%	4.0%		$1,000
	Mobilization	8.0-10.0%	10.0%		$1,000
	Erosion Control	0.5-2.0%	2.0%		$500
	Contingency	30-40%	40.0%		$1,800
	Escalation (per year)	0.5-2.0%	2.0%		$0
	Estimate Year		2011		
	Construction Year		2011		
			TOTAL CONSTRUCTION COST		***$9,784***

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		$1,300
	Construction Engineering	10.0%	10.0%		$1,000
			TOTAL PROJECT COST		**$13,000**

Notes:

Curb extension includes new curb and sidewalk for the first parking space adjacent to intersection
Parking space is MUTCD standard 8'x20'
Assume 1 signs per corner; 1.5 SF and one post per sign
Drainage impacts and revisions are assumed

CH2M HILL - ORDER OF MAGNITUDE ESTIMATE
City of Vernonia Transportation System Plan

PROJECT: Low Build F - Bridge Street Bioswale	**PREPARED BY: Darren Hippenstiel**	**DATE: 03/03/2011**
DESIGN LEVEL: Planning Level		
KIND OF WORK: Signing and Striping	**LENGTH (MILE):**	**SHEET:** 1 of 1

NO.	ITEM	UNIT	QUANTITY	UNIT COST	COST
1	Signs	SF	1.5	$25.00	$38
2	Posts	Foot Board	18	$7.00	$126
3	Bioswale Planting	SF	160	$12.00	$1,920
4	Curb	LF	56	$15.00	$840
5	Inlet/Cath Basin	EA	1	$1,500.00	$1,500
6	12 Inch Storm Sewer Pipe, 5' deep	LF	20	$80.00	$1,600
			SUBTOTAL		***$6,024***

	ADDITIONAL CONST. COSTS	SUGGESTED	PERCENTAGE		COST
	Construction Surveying	1.0-2.5%	2.0%		$1,000
	TP & DT	3.0-8.0%	4.0%		$1,000
	Mobilization	8.0-10.0%	10.0%		$1,000
	Erosion Control	0.5-2.0%	2.0%		$500
	Contingency	30-40%	40.0%		$2,400
	Escalation (per year)	0.5-2.0%	2.0%		$0
	Estimate Year		2011		
	Construction Year		2011		
			TOTAL CONSTRUCTION COST		***$11,924***

	ENGINEERING COSTS	SUGGESTED	PERCENTAGE		COST
	Design Engineering	13.0%	13.0%		$1,600
	Construction Engineering	10.0%	10.0%		$1,200
			TOTAL PROJECT COST		**$15,000**

Notes:

Bioswale includes new curb and planting for the first parking space adjacent to intersection
Parking space is MUTCD standard 8'x20'
Assume 1 signs per corner; 1.5 SF and one post per sign
Drainage impacts and revisions are assumed
Bioswale planting includes grading, engineered soil, planting and irrigation
Costs for bioswale planting provided by Alta Planning + Design

Unit Costs (Based on Development Pricing)

Curb, Gutter, Sidewalks, & Enclosed Drainage (Unit: Mile)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Concrete Curb and Gutter	LF	10,560	$15.00	$158,400.00	For Both Sides of Rdwy
Concrete Sidewalk	SF	95,040	$5.00	$475,200.00	For Both Sides of Rdwy, 9' Avg. Wide
15 Inch Storm Sewer Pipe, 10' deep	LF	5,280	$85.00	$448,800.00	Long. Storm Pipe, Including Trenching/Backfill
Storm Manhole	EA	21	$3,000.00	$63,000.00	Every 250' (21 in a mile)
Standard Catch Basin	EA	42	$1,500.00	$63,000.00	Every 250' (21 in a mile*2 for both sides= 42)
			SUBTOTAL	$1,208,400.00	
Clearing and Grubbing - 0.6%				$7,250.40	
Removal of Structures - 1.2%				$14,500.80	
			TOTAL UNIT COST	**$1,230,200.00**	

Curb, Gutter, Sidewalk (1 Side), & Enclosed Drainage (Unit: Mile)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Concrete Curb and Gutter	LF	5,280	$15.00	$79,200.00	One Side Only
Concrete Sidewalk	SF	108,240	$5.00	$541,200.00	One Side Only, 20.5' width
15 Inch Storm Sewer Pipe, 10' deep	LF	5,280	$85.00	$448,800.00	Long. Storm Pipe, Including Trenching/Backfill
Storm Manhole	EA	21	$3,000.00	$63,000.00	Every 250' (21 in a mile)
Standard Catch Basin	EA	42	$1,500.00	$63,000.00	Every 250' (21 in a mile*2 for both sides= 42)
			SUBTOTAL	$1,195,200.00	
Clearing and Grubbing - 0.6%				$7,171.20	
Removal of Structures - 1.2%				$14,342.40	
			TOTAL UNIT COST	**$1,216,700.00**	

Sidewalk (at grade), & Enclosed Drainage (Unit: Mile)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Concrete Curb and Gutter	LF		$15.00	$0.00	No Curbs
Concrete Sidewalk	SF	126,720	$5.00	$633,600.00	For Both Sides of Rdwy, 12' Wide
15 Inch Storm Sewer Pipe, 10' deep	LF	5,280	$85.00	$448,800.00	Long. Storm Pipe, Including Trenching/Backfill
Storm Manhole	EA	21	$3,000.00	$63,000.00	Every 250' (21 in a mile)
Standard Catch Basin	EA	21	$1,500.00	$31,500.00	Every 250' (21 in a mile located in swale)
			SUBTOTAL	$1,176,900.00	
Clearing and Grubbing - 0.6%				$7,061.40	
Removal of Structures - 1.2%				$14,122.80	
			TOTAL UNIT COST	**$1,198,100.00**	

Sidewalk (at grade), & Enclosed Drainage (Unit: Mile)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Concrete Curb and Gutter	LF		$15.00	$0.00	No Curbs
Concrete Sidewalk	SF	63,360	$5.00	$316,800.00	12'; One side
15 Inch Storm Sewer Pipe, 10' deep	LF	5,280	$85.00	$448,800.00	Long. Storm Pipe, Including Trenching/Backfill
Storm Manhole	EA	21	$3,000.00	$63,000.00	Every 250' (21 in a mile)
Standard Catch Basin	EA	21	$1,500.00	$31,500.00	Every 250' (21 in a mile located in swale)
			SUBTOTAL	$860,100.00	
Clearing and Grubbing - 0.6%				$5,160.60	
Removal of Structures - 1.2%				$10,321.20	
			TOTAL UNIT COST	**$875,600.00**	

Sidewalk, Curb one side & Enclosed Drainage (Unit: Mile)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Concrete Curb and Gutter	LF	5,280	$15.00	$79,200.00	Curb One Side
Concrete Sidewalk	SF	63,360	$5.00	$316,800.00	12'; One side
15 Inch Storm Sewer Pipe, 10' deep	LF	5,280	$85.00	$448,800.00	Long. Storm Pipe, Including Trenching/Backfill
Storm Manhole	EA	21	$3,000.00	$63,000.00	Every 250' (21 in a mile)
Standard Catch Basin	EA	21	$1,500.00	$31,500.00	Every 250' (21 in a mile located in swale)
			SUBTOTAL	$939,300.00	
Clearing and Grubbing - 0.6%				$5,635.80	
Removal of Structures - 1.2%				$11,271.60	
			TOTAL UNIT COST	**$956,200.00**	

Shared Use Path (Unit: Mile)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Asphalt	TN	802	$85.00	$68,151.11	12' path, 5280' long, depth=2 IN, density=2.050 TN/CY
Aggregate Base	TN	4,341	$22.00	$95,509.33	12' Lane, 5280' long, depth=12 IN, density=1.850 TN/CY
12 Inch Storm Sewer Pipe, 5' deep	LF	260	$80.00	$20,800.00	Lateral Culverts: 20' long, every 400 LF (13/mile)
			SUBTOTAL	$184,460.44	
Clearing and Grubbing - 0.6%				$1,106.76	
Removal of Structures - 1.2%				$2,213.53	
			TOTAL UNIT COST	**$187,800.00**	

New Roadway - State Highway (Unit: Lane-Mile)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Asphalt	TN	3,207	$85.00	$272,604.44	12' Lanes, 5280' long, depth=8 IN, density=2.050 TN/CY
Aggregate Base	TN	5,065	$22.00	$111,427.56	12' Lanes, 5280' long, depth=12 IN, density=1.850 TN/CY
12 Inch Storm Sewer Pipe, 10' deep	LF	273	$80.00	$21,840.00	Lateral Culverts: 13' per lane, every 250 LF (21/mile)
Excavation	CY	-	$15.00	$0.00	
Embankment	CY	-	$15.00	$35,200.00	See Below For Earthwork
Thermoplastic Pavement Striping	LF	5,280	$1.50	$7,920.00	1 solid stripe per lane
			SUBTOTAL	$448,992.00	
Clearing and Grubbing - 0.6%				$2,693.95	
Removal of Structures - 1.2%				$5,387.90	
			TOTAL UNIT COST	**$457,100.00**	

New Roadway - Collector Roads (Unit: Lane-Mile)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Asphalt	TN	2,405	$85.00	$204,453.33	12' Lanes, 5280' long, depth=6 IN, density=2.050 TN/CY
Aggregate Base	TN	2,894	$22.00	$63,672.89	12' Lanes, 5280' long, depth=8 IN, density=1.850 TN/CY
12 Inch Storm Sewer Pipe, 10' deep	LF	273	$80.00	$21,840.00	Lateral Culverts: 13' per lane, every 250 LF (21/mile)
Excavation	CY	-	$15.00	$0.00	
Embankment	CY	-	$15.00	$35,200.00	See Below For Earthwork
Thermoplastic Pavement Striping	LF	5,280	$1.50	$7,920.00	1 solid stripe per lane
			SUBTOTAL	$333,086.22	
Clearing and Grubbing - 0.6%				$1,998.52	
Removal of Structures - 1.2%				$3,997.03	
			TOTAL UNIT COST	**$339,100.00**	

New Roadway - Local Roads (Unit: Lane-Mile)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Asphalt	TN	1,604	$85.00	$136,302.22	12' Lanes, 5280' long, depth=4 IN, density=2.050 TN/CY
Aggregate Base	TN	2,894	$22.00	$63,672.89	12' Lanes, 5280' long, depth=8 IN, density=1.850 TN/CY
12 Inch Storm Sewer Pipe, 10' deep	LF	273	$80.00	$21,840.00	Lateral Culverts: 13' per lane, every 250 LF (21/mile)
Excavation	CY	-	$15.00	$0.00	
Embankment	CY	-	$15.00	$35,200.00	See Below For Earthwork
Thermoplastic Pavement Striping	LF	5,280	$1.50	$7,920.00	1 solid stripe per lane
			SUBTOTAL	$264,935.11	
Clearing and Grubbing - 0.6%				$1,589.61	
Removal of Structures - 1.2%				$3,179.22	
			TOTAL UNIT COST	**$269,700.00**	

Overlay Existing Roadway (Unit: Lane-Mile)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Asphalt	TN	802	$85.00	$68,151.11	12' Lanes, 5280' long, depth=2 IN, density=2.050 TN/CY
Cold Plane Pavement Removal	SF	15,840	$1.00	$15,840.00	12' Lanes, 5280' long, 25% of extg. rdwy.
Thermoplastic Pavement Striping	LF	5,280	$1.50	$7,920.00	1 solid stripe per lane
			TOTAL UNIT COST	**$91,900.00**	

Reconstruct Existing Roadway (Unit: Lane-Mile)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Excavation	CY	3,520	$10.00	$35,200.00	Removal of 4in. AC and 14in Aggregate Base
New Roadway	-	-	-	$269,700.00	See 'New Roadway' Sheet for Cost Breakdown
			TOTAL UNIT COST	**$304,900.00**	

Intersection Widening (Unit: Each)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Asphalt	TN	296	$85.00	$25,169.44	26' of widening per approach, 2 approaches, 150' long, depth=6 IN, density=2.050 TN/CY
Aggregate Base	TN	624	$22.00	$13,717.41	26' of widening per approach, 2 approaches, 150' long, depth=14 IN, density=1.850 TN/CY
Concrete Curb and Gutter	LF	600	$15.00	$9,000.00	300' per approach, 2 approaches
Sidewalk	SF	4,200	$5.00	$21,000.00	300' per approach, 2 approaches, 7' Wide
Demolition of Extg. Curb/Sidewalk	CY	200	$15.00	$3,000.00	300' per approach, 2 approaches, 9' Wide, 1' Deep
Thermoplastic Pavement Striping	LF	1,200	$1.50	$1,800.00	2 solid stripes per lane, 4 new lanes, 150' long
			SUBTOTAL	$73,686.85	
Clearing and Grubbing - 0.6%				$442.12	
Removal of Structures - 1.2%				$884.24	
Landscaping - 0.5%				$368.43	
			TOTAL UNIT COST	**$75,400.00**	

Large Roundabouts (Unit: Each)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Asphalt	TN		$85.00	$0.00	26' of widening per approach, 2 approaches, 150' long, depth=6 IN, density=2.050 TN/CY
Aggregate Base	TN		$22.00	$0.00	26' of widening per approach, 2 approaches, 150' long, depth=14 IN, density=1.850 TN/CY
Concrete Curb and Gutter	LF		$15.00	$0.00	300' per approach, 2 approaches
Concrete Sidewalk	SF		$5.00	$0.00	300' per approach, 2 approaches, 7' Wide
Concrete Islands	SF		$12.00		
Demolition of Extg. Curb/Sidewalk	CY		$15.00	$0.00	300' per approach, 4 approaches, 9' Wide, 1' Deep
Thermoplastic Pavement Striping	LF		$1.00	$0.00	2 solid stripes per lane, 4 new lanes, 150' long
			SUBTOTAL	$0.00	
Clearing and Grubbing - 0.6%				$0.00	
Removal of Structures - 1.2%				$0.00	
Landscaping - 0.5%				$0.00	
Roundabout OLD	EA	1	$1,100,000.00	$1,100,000.00	Includes all costs associated with the construction of a One Lane Roundabout where an existing intersection is located. Cost per Rick Kuehn.
			TOTAL UNIT COST	**$1,100,000.00**	

Small Roundabouts (Unit: Each)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Asphalt	TN		$85.00	$0.00	26' of widening per approach, 2 approaches, 150' long, depth=6 IN, density=2.050 TN/CY
Aggregate Base	TN		$21.00	$0.00	26' of widening per approach, 2 approaches, 150' long, depth=14 IN, density=1.850 TN/CY
Concrete Curb and Gutter	LF		$15.00	$0.00	300' per approach, 2 approaches
Concrete Sidewalk	SF		$5.00	$0.00	300' per approach, 2 approaches, 7' Wide
Concrete Islands	SF		$12.00		
Demolition of Extg. Curb/Sidewalk	CY		$15.00	$0.00	300' per approach, 4 approaches, 9' Wide, 1' Deep
Thermoplastic Pavement Striping	LF		$1.00	$0.00	2 solid stripes per lane, 4 new lanes, 150' long
			SUBTOTAL	$0.00	
Clearing and Grubbing - 0.6%				$0.00	
Removal of Structures - 1.2%				$0.00	
Landscaping - 0.5%				$0.00	
Roundabout OLD	EA	1	$1,100,000.00	$400,000.00	Includes all costs associated with the construction of a One Lane Roundabout in virgin ground. Cost per Rick Kuehn.
			TOTAL UNIT COST	**$400,000.00**	

Restriping Existing Roadway (Unit: mi)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Stripe Removal	LF	1	$0.65	$0.65	1 solid stripe removed per lane
Thermoplastic Pavement Striping	LF	1	$1.00	$1.00	1 solid stripe per lane
			TOTAL UNIT COST	**$1.65**	

Interconnnect Signal (Unit: Lump Sum)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Interconnect Signal System	LS	1	$35,000.00	$35,000.00	Includes all costs to interconnect
			TOTAL UNIT COST	$35,000.00	

New Signal (Unit: Each)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
New Signal	LS	1	$300,000.00	$300,000.00	Includes signal system and all appurtenances (pole, wiring, detectiion devices, etc.) for 1 intersection
			TOTAL UNIT COST	$300,000.00	

Signal Modifications (Unit: Each)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Modify Signal	LS	1	$65,000.00	$65,000.00	Includes all evaluations and modifications to the signal at one intersection
			TOTAL UNIT COST	$65,000.00	

Earthwork (Unit: Lane-Mile)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Excavation	CY	1,173	$15.00	$17,600.00	Length=5280/2=2640LF, Max depth = 2'
Embankment	CY	1,173	$15.00	$17,600.00	Length=5280/2=2640LF, Max height = 2'
			TOTAL UNIT COST	$35,200.00	

Earthwork Estimated (Unit: CY)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Earthwork (Cut/Fill)	CY	1	$30.00	$30.00	Rock excavation
			TOTAL UNIT COST	$30.00	

Illumination (Unit: Mile)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Luminaire and appurtenances	EA	52	$ 6,500.00	$338,000.00	Luminaire, pole, wiring, etc (1 pole on each side every 200'=52 poles)
			TOTAL UNIT COST	$338,000.00	

Landscaping (Unit: Mile)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Landscaping	LS	1	$ 235,000.00	$235,000.00	Plantings, Trees, Topsoil, and Irrigation sums up to aproximately $235,000 per mile (for both sides of roadway)
			TOTAL UNIT COST	$235,000.00	

Bridges (Unit: Square Foot)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
				$0.00	The cost of this item is project dependent; see note 3 of the directions tab for more information
			TOTAL UNIT COST	$0.00	

Walls (Unit: Square Foot)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Standard Retaining Wall	LS	1	$55.00	$55.00	Soil Nail Wall with facing
			TOTAL UNIT COST	$55.00	

Right-of-Way (Unit: Square Foot)

ITEM	UNIT	AMOUNT	UNIT COST	TOTAL	COMMENTS
Right-of-Way Acquisition	LS	1	$10.00	$10.00	ROW acquisition cost is approx. $10/SF
			TOTAL UNIT COST	$10.00	

Facility		Bike Lane (Roadway Expansion)	Bike Lane (Restriping)	Sharrows	Bike Boulevard	Multi-Use Path (12', asphalt)	Access-way	Natural Surface Trail (6', difficult terrain)	Multi-Use Path Bridge (14')	Sidewalk (6')	Sidewalk Widening (SF)	Crosswalks (EA)	Signs (EA)	Stop Bar (EA)	Median Refuge Island (EA)	Curb Extension (EA)	Curb Ramp (EA)	Pedestrian Countdown Signal (EA)
Raw Construction Cost		*$48.78*	*$23.00*	*$3.00*	*$10.27*	*$89.65*	*$43.43*	*$15.00*	*$4,000.00*	*$92.67*	*$5.00*	*$500*	*$200*	*$150*	*$15,000*	*$7,500*	*$1,500*	*$1,000*
Contingency	*30%*	$14.63	$6.90	$0.90	$3.08	$26.90	$13.03	$4.50	$1,200.00	$27.80	$1.50	$150.00	$60.00	$45.00	$4,500.00	$2,250.00	$450.00	$300.00
Engineering/Design	*20%*	$9.76	$4.60	$0.60	$2.05	$17.93	$8.69	$3.00	$800.00	$18.53	$1.00	$100.00	$40.00	$30.00	$3,000.00	$1,500.00	$300.00	$200.00
Construction Overhead, Mobilization	*15%*	$7.32	$3.45	$0.45	$1.54	$13.45	$6.51	$2.25	$600.00	$13.90	$0.75	$75.00	$30.00	$22.50	$2,250.00	$1,125.00	$225.00	$150.00
Project Administration	*10%*	$4.88	$2.30	$0.30	$1.03	$8.97	$4.34	$1.50	$400.00	$9.27	$0.50	$50.00	$20.00	$15.00	$1,500.00	$750.00	$150.00	$100.00
Full Burden	***75%***	**$85.37**	**$40.25**	**$5.25**	**$17.98**	**$156.89**	**$75.99**	**$26.25**	**$7,000.00**	**$162.17**	**$8.75**	**$875.00**	**$350.00**	**$262.50**	**$26,250.00**	**$13,125.00**	**$2,625.00**	**$1,750.00**

4) Connect Future Crown-Zellerbach Trail to Banks-Vernonia Trail

Facility	Length	Multi-Use Path	14' Bridge	Raw	Rounded
		$157	*$4,043*		
CZ-BV Trail	5700	5700		$894,289	$900,000
Nehalem River Bike Ped Bridge	250		200	$808,500	$810,000
			Total:	**$1,702,789**	**$1,710,000**

6) Bicycle/Pedestrian Connection From Vernonia Schools to Riverside Drive

		Multi-Use Path		
Facility	**Length**	*$157*	**Raw**	**Rounded**
MUP	1450	1450	$227,494	$230,000
			$227,494	**$230,000**

following edge of school lot from riverside to missouri (last segment near missouri may be unnecessary, in future parking lot)

B) Improve Pedestrian Crossing at California Avenue and OR 47/Bridge Street to Access O-A Hill Sidepath

		Multi-Use Path	Crosswalk	Curb Ramp	Signs	Sidewalk		
Facility	**Length**	*$157*	*$875*	*$2,625*	*$350*	*$162*	**Raw**	**Rounded**
Sidewalk on N side of Bridge Street	175					175	$28,379	$30,000
Sidewalk around SE corner	50					50	$8,108	$10,000
Crosswalk	1		1				$875	$10,000
Curb Ramps	2			2			$5,250	$10,000
Signs	2				2		$700	$10,000
							$43,313	**$50,000**

C) Construct Sidewalk Along OR 47/Mist Drive

		Sidewalk		
Facility	**Length**	*$162*	**Raw**	**Rounded**
Sidewalk	4600	4600	$745,967	$750,000
			$745,967	**$750,000**

D) Add sidewalks or connect existing sidewalks along collector streets

		Bike Lanes (restripe)	Sidewalk (both sides)		
Facility	**Length**	*$40*	*$324*	**Raw**	**Rounded**
State	3,000	3,000	1,900	$736,983	$740,000
Nehalem	1,700	1,700	1,700	$619,792	$620,000
Rose	3,100	3,100	3,100	$1,130,208	$1,140,000
2nd Ave	1,500	1,500	1,500	$546,875	$550,000
Louisiana	2,000	2,000	2,000	$729,167	$730,000
N Louisiana	1,200	1,200	1,200	$437,500	$440,000
Knott	3,500	3,500	3,500	$1,276,042	$1,280,000
		16,000	29,800	**$5,476,567**	**$5,480,000**

E) Bicycle/Pedestrian Connection From Vernonia Schools to Nehalem View Development

		Multi-Use Path		
Facility	**Length**	*$157*	**Raw**	**Rounded**
	1300	1300	$203,961	$210,000
			$203,961	**$210,000**

G1) Safe Routes to School Connection – Alabama Avenue

		Sidewalk (6' one side, no C&G)		
Facility	**Length**	*$84*	**Raw**	**Rounded**
	1750	1750	$147,000	$150,000
			$147,000	**$150,000**

G2) Safe Routes to School Connection – Mississippi Avenue

		Sidewalk (6' one side, no C&G)		
Facility	**Length**	*$84*	**Raw**	**Rounded**
	1200	1200	$100,800	$110,000
			$100,800	**$110,000**

G3) Safe Routes to School Connection – Texas Avenue

		Sidewalk (6' one side, no C&G)		
Facility	**Length**	*$84*	**Raw**	**Rounded**
	900	900	$75,600	$80,000
			$75,600	**$80,000**

H) Soft-Surface Trail Improvements up O-A Hill

Segment	Crow-Flies Length	Low Elevation	High Elevation	Slope	Adjusted Length (to make 8%)	Cost	
Top Park Loop	400	670	728	14.5%	725	$19,031	
Main Slope	336	626	696	20.8%	875	$22,969	
To Bridge Street	265	622	650	10.6%	350	$9,188	
To North Street	228	624	647	10.1%	287.5	$7,547	**Rounded**
					Total:	**$58,734**	**$60,000**

APPENDIX F

IMPLEMENTING LANGUAGE

Implementing Ordinances: City of Vernonia Transportation System Plan Update

PREPARED FOR: Carole Connell, City of Vernonia
Bill Haack, City of Vernonia
Seth Brumley, ODOT

PREPARED BY: Terra Lingley, CH2M HILL

COPIES: Larry Weymouth, CH2M HILL
Vernonia TSP Update PMT and PAC

DATE: May 23, 2011

This memorandum presents draft implementing ordinances, amendments to the Comprehensive Plan, and Development Code to bring these documents into compliance with the TSP Update document, the Oregon Transportation Plan, and Transportation Planning Rule (TPR).

Overview

The TPR (OAR 660 Division 12) implements Oregon's Statewide Planning Goal 12 (transportation) and promotes the development of safe, convenient, and economic transportation systems that reduce reliance on automobile travel. TPR Section 660-012-0045(1) requires that "each local government shall amend its land use regulations to implement the TSP."

Recommended changes are based on a review of the City of Vernonia Zoning Ordinance and Comprehensive Plan for consistency with the TPR. Where the Zoning Ordinance is already in compliance, it is noted in the discussion.

The discussion of recommended changes is organized by (1) the applicable section(s) of the TPR that could prompt a change in the Vernonia Zoning Ordinance, (2) the recommended additions, deletions, or revisions to the Vernonia Zoning Ordinance, or the applicable section that already addresses TPR compliance, and (3) a brief description of the recommended change (if necessary).

Zoning Ordinance Amendments to Support the TSP

TPR Code sections are shown in *Italics*, City of Vernonia Zoning Code is shown in regular text. Recommended deletions are shown in ~~strikethrough format~~ and additions are in <u>underline format.</u>

The Vernonia Zoning Ordinance includes section 9-01.11 Transportation Planning, Standards, and Procedures. This section is already in compliance with a number of TPR requirements, described below.

I. OAR 660-12-0045(1)(b)

Each local government shall amend its land use regulations to implement the TSP.

To the extent, if any, that a transportation facility, service, or improvement concerns the application of a comprehensive plan provision or land use regulation, it may be allowed without further land use review if it is permitted outright or if it is subject to standards that do not require interpretation or the exercise of factual, policy or legal judgment.

Section 9-01.11-50 [Transportation Improvements] section (C.) includes language that allows transportation improvements to be permitted outright in any zone, and satisfies this TPR requirement. Changes to the section suggested below include consideration of transit as recommended in the Columbia County Community-Wide Transit and U.S. Highway 30 Transit Access Plan.

E. Sites that include existing or planned transit facilities may be required to provide the following:
   1. A reasonably direct pedestrian connection between the transit facility and building entrances on the site. "Reasonably direct" is defined as a route that does not deviate unnecessarily from a straight line or a route that does not involve a significant amount of out-of-direction travel for likely users.
   2. A transit passenger landing pad accessible to disabled persons.
   3. An easement or dedication for a passenger shelter or bench if such facility is identified in the Vernonia Transportation System Plan or the adopted County Transit Plan.
   4. Lighting at the transit facility.

II. OAR 660-12-0045(1)(c)

Each local government shall amend its land use regulations to implement the TSP.

In the event that a transportation facility, service or improvement is determined to have a significant impact on land use or to concern the application of a comprehensive plan or land use regulation and to be subject to standards that require interpretation or the exercise of factual, policy or legal judgment, the local government shall provide a review and approval process that is consistent with 660-012-0500. To facilitate implementation of the TSP, each local government shall amend its land use regulations to provide for consolidated review of land use decisions required to permit a transportation project.

Section 9-01.11-20 [Public Notice and Coordinated Review] satisfies this TPR requirement. Changes to the section suggested below include consideration of transit as recommended in the Columbia County Community-Wide Transit and U.S. Highway 30 Transit Access Plan.

B. The City shall provide written notice to the providers of transportation facilities and services, such as ODOT or Columbia County, in an application for a land division, design review, conditional use or building permit is located on or adjacent to an ODOT transportation facility or service. Columbia County Rider shall receive notice of proposals that potentially impact transit ridership or facilities. Notice shall be provided at least 20 days prior to the public hearing or decision on the application.

C. Land use review associated with proposed transportation facilities, services, and improvements shall be coordinated with other jurisdictions and agencies that provide those facilities or services, such as Columbia County and ODOT when the proposed development has an impact on the transportation facility or service, as determined by the provider.

III. OAR 660-12-0045(2)(a)

Local governments shall adopt land use or subdivision ordinance regulations, consistent with applicable federal and state requirements, to protect transportation facilities, corridors and sites for their identified functions. Such regulations shall include:

Access control measures, for example, driveway and public road spacing, median control and signal spacing standards, which are consistent with the functional classification of roads and consistent with limiting development on rural lands to rural uses and densities.

Section 9-01.11-30 [Access Management Standards] satisfies this TPR requirement.

Table 11-30-1 Access Spacing Standards

Functional Classification	Minimum Access Spacing	Signal Spacing
Arterial (OR 47)	Five hundred (500) feet from arterial or collector – speeds over 35 mph	½ Mile
	Three hundred fifty (350) ~~Four hundred (400)~~ feet from any other intersection (including private access) for areas where speeds are 35 mph and below. Private driveways are discouraged within a Special Transportation Area (STA), but where allowed, the minimum access spacing standard is 175 feet or mid-block, if the current city block is less than 350 feet in length. The Public Works Director may permit a minimum spacing of not less than 300 feet except as otherwise approved by the City and as permitted by the ODOT-designated STA	
Collector	Three hundred (300) feet from arterial	None
	One hundred and fifty (150) feet from any other intersection (including private access)	
Local Street	Two hundred (200) feet from arterial	None
	One Hundred (100) feet from any intersection with a collector, or local street	
	No spacing requirements from intersections with a private access	

D. Shared driveways along a common property line are strongly encouraged. Access permits may be denied if reasonable alternative access is available.

E. The City may require the closing or consolidation of existing curb cuts or other vehicle access points, recording of reciprocal access easements (i.e., for shared driveways), development of a frontage street, installation of traffic control devices, and/or other mitigation as a condition of granting an access permit, to ensure the safe and efficient operation of the street and highway system.

F. The City may reduce required separation distance of access points where they prove impractical due to lot dimensions, existing development, other physical features, or conflicting code requirements, provided all of the following requirements are met:

   a. Joint-use driveways and cross-access easements are provided in accordance with Joint and Cross-Access Requirements, described below.

b. The site plan incorporates a unified access and circulation system in accordance with this Section; and

c. The property owner(s) enter in a written agreement with the City, recorded with the deed, that pre-existing connections on the site will be closed and eliminated after construction of each side of the joint-use driveway.

G. Joint and Cross-Access – Requirement. The number of driveway and private street intersections with public streets should be minimized by the use of shared driveways for adjoining lots where feasible. When necessary for traffic safety and access management purposes, or to access flag lots, the City may require joint access and/or shared driveways in the following situations as follows:

1. For shared parking areas;

2. For adjacent developments, where access onto an arterial is limited;

3. For multi-tenant developments, and developments on multiple parcels. Such joint accesses and shared driveways shall incorporate all of the following:

   a. A continuous service drive or cross-access corridor that provides for driveway separation consistent with the applicable transportation authority's access management classification system and standards;

   b. A design speed of 10 miles per hour and a maximum width of 20 feet, in addition to any parking alongside the driveway; additional driveway width or fire lanes may be approved when necessary to accommodate specific types of service vehicles, loading vehicles, or emergency service vehicles;

   c. Driveway stubs to property lines (or future extension) and other design features may be required so that abutting properties with future development potential can connect to the cross-access driveway.

IV. OAR 660-12-0045(2)(b)

Local governments shall adopt land use or subdivision ordinance regulations, consistent with applicable federal and state requirements to protect transportation facilities, corridors and sites for their identified functions. Such regulations include: Standards to protect future operation of roads, transitways and major transit corridors.

Section 9-01.11-40 [Protection of Transportation Facilities] satisfies this TPR requirement.

Additionally, Section 9-01.11-90 [Traffic Impact Studies] includes specific requirements for when a Traffic Impact Study, or traffic impact analysis is required. The revisions included below are suggested to ensure that the Public works standards and the Zoning Ordinance are consistent.

9-01.11-90 [Traffic Impact Studies]

The purpose of this section of the code is to assist in determining which road authorities participate in land use decision, and to implement Section 660-012-0045 (2) (e) of the State Transportation Planning Rule that requires the City to adopt a process to apply conditions to development proposals in order to minimize impacts and protect transportation facilities.

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 a study.

A. When a Traffic Study is Required. The City or other road authority with jurisdiction may require a Traffic Impact Study (TIS) as part of an application for development, a change in use, or a change in access. A TIS shall be required when a land use application involves one or more of the following actions:

1. A change in zoning or plan amendment designation;
2. Any proposed development or land use action that a road authority states may have operational or safety concerns along its facility(ies); or
3. An increase in site traffic volume generation by 300 Average Daily Trips (ADT) or more; or
4. An increase in peak hour volume of a particular movement to and from the State highway by twenty percent (20%); or
5. An increase in use of adjacent streets by vehicles exceeding the 20,000 pound gross vehicle weight by 10 vehicles ~~of~~ <u>or</u> more per day; or
6. The location of the access driveway does not meet minimum sight distance requirements, or is located where vehicles entering or leaving the property are restricted, or such vehicles queue or hesitate on the State highway, creating a safety hazard; or
7. A change in internal traffic patterns that may cause safety problems, such as back up onto a street or greater potential for traffic accidents; or
8. <u>A development's location, proposed site plan, or traffic characteristics could affect access management, street capacity, or known traffic problems or deficiencies in a development's study area.</u>

V. OAR 660-12-0045(2)(f)

Local government shall adopt land use or subdivision ordinance regulations, consistent with applicable federal and state requirements, to protect transportation facilities, corridors and sites for their identified functions. Such regulations include:

Regulations to provide notice to public agencies providing transportation facilities and services, MPOs, and ODOT of:

(A) Land use applications that require public hearings;

(B) Subdivision and partition applications;

(C) Other applications which affect private access to roads; and

(D) Other applications within airport noise corridors and imaginary surfaces which affect airport operations.

Section 9-01.11-20 [Public Notice and Coordinated Review] (C.) satisfies this TPR requirement.

VI. OAR 660-12-0045(2)(g)

Local governments shall adopt land use or subdivision ordinance regulations, consistent with applicable federal and state requirements, to protect transportation facilities, corridors and sites for their identified functions. Such regulations shall include:

Regulations assuring that amendments to land use designations, densities, and design standards are consistent with the functions, capacities and levels of service of facilities identified in the TSP.

Section 9-01.11-40 [Protection of Transportation Facilities] satisfies this TPR requirement.

VII. OAR 660-12-0045(3)(a)

Local governments shall adopt land use or subdivision regulations for urban areas and rural communities as set forth below.

Bicycle parking facilities as part of a new multi-family residential developments of four units or more, new retail, office and institutional developments, and all transit transfer stations and park-and-ride lots.

Section 9-01.11-80 [Bicycle Parking Facilities] satisfies this TPR requirement.

VII OAR 660-12-0045(3)(b)

Local governments shall adopt land use or subdivision regulations for urban areas and rural communities as set forth below.

On-site facilities shall be provided which accommodate safe and convenient pedestrian and bicycle access from within new subdivisions, multi-family developments, planned developments, shopping centers, and commercial districts to adjacent residential areas and transit stops, and to neighborhood activity centers within one-half mile of the development. Single-family residential developments shall generally include streets and accessways. Pedestrian circulation through parking lots should generally be provided in the form of accessways.

Vernonia Zoning Ordinance Updates

Street standards for bicycle and pedestrian facilities have been modified based on the revised street standards and cross sections found in the TSP update. Changes to the Zoning Ordinance are suggested below to ensure consistency between the TSP update and the City of Vernonia Zoning Ordinance. The TSP update simplifies the roadway standards, removing the urban/rural distinction, as it is assumed that any roadway within the City limits will be urban.

9-01.11-60 [Street Standards]

A. New roads and roadway improvements shall be consistent with the general location, functional classification and street standards as set forth in the TSP. <u>Where inconsistencies exist between the Vernonia TSP and the City Public Works Design Standards, the TSP should prevail unless otherwise</u>

determined by the City Engineer, Public works Director, or Planning Director.

B. New developments shall provide for street connectivity.

C. Table 11-60-1 ~~(Table 3.1 of the TSP)~~ provides street standards for the various street functional classifications ~~and is incorporated by this reference~~. The cross sections emphasize the desire to develop multi-modal roadway facilities that incorporate shared-use paths, sidewalks, and bike lanes where possible.

D. The City Engineer may adjust the street standards by up to ten percent (10%) when it is found that any of the following conditions apply:

1. The existing right-of-way is substandard; or

2. Exceptional topographic conditions exist; or

3. Significant trees or vegetation would be removed.

9-01.11-70 [Internal Connections]

C. Connections to the Right-of-Way.

1. Every commercial, office, and institutional building shall include a pedestrian walkway connected to the public right-of-way. A walkway shall be provided for every three hundred (300) feet of street frontage.
2. When the proposed commercial, office, institutional or multi-family uses are located on a site within ¼ mile of an existing or planned transit stop, the proposed pedestrian circulation system must demonstrate a safe and direct pedestrian route from building entrances to the transit stop or to a public right-of-way that provides access to the transit stop.

In addition, the Land Division Code (Section 9-02) will be updated to reflect the new standards included in the Vernonia TSP update.

9-02.08 [Street Design Standards]

9-02.08-20 [Streets]

B. Required Right-of-Way and Roadway Width. Unless otherwise indicated on the development plan, the street right-of-way and roadway widths shall not be less than the width in feet shown in the following table:

Type of Street	Minimum Right-of-Way Width (feet)	Required Roadway Width (feet)
~~Urban~~		
Local ~~- New Construction~~	40~~50~~	20~~28~~
~~Local - Preferred Retrofit~~	~~46~~	~~24~~
~~Local - Minimum Retrofit~~	~~25~~	~~18~~
Collector	55~~62~~	50~~38~~
Arterial	63~~72~~	60~~48~~
~~Rural~~		
~~Local~~	~~30~~	~~18~~
~~Collector~~	~~62~~	~~36~~
~~Arterial~~	~~60~~	~~34~~
Radius for Turn Around at End of Cul-de-Sac	50	40
Alleys	20	20

H. Half Streets. Half streets, while generally not acceptable, may be approved where essential to the reasonable development of the subdivision or partition when in conformity with the other requirements of these regulations and when the Planning Commission finds it will be practical to require the dedication of the other half when the adjoining property is divided. Whenever a half street is adjacent to a tract to be divided, the other half of the street shall be provided within such tract. Reserve strips and street plugs may be required to preserve the objectives of the half streets.

Applicants for land divisions who are approved for half street construction shall sign a written waiver of their right to remonstrate or otherwise legally oppose the installation of public streets, where such facilities are or may be proposed to serve the applicants property as part of any local improvement (assessment) district, developer installed improvement project or a local government improvement project of any type. This Section shall not, however, prohibit the applicant, developer, or owner from expressing his or her personal views for the record regarding the installation of' a public facility.

N. Alleys. Alleys ~~shall~~ may be provided for additional access in commercial and industrial districts, unless other permanent provisions for access to off-street parking and loading facilities are approved by the Planning Commission. The corners of alley intersections shall have a radius of not less than twelve (12) feet.

9-02.09-30 [Improvements in Subdivisions]

E. Sidewalks – Sidewalks shall be installed on both sides of a public street or as a shared use path on one side of the street as described in the street standards in the TSP, and

in any special pedestrian way within the subdivision, except that in the case of primary or secondary arterials, or special type industrial districts, the Planning Commission may approve a subdivision without sidewalks if alternative pedestrian routes are available; and provided further, that in the case of streets serving residential areas having single-family dwellings located on lots equivalent to two and one half (2½) or less dwellings per gross acre, the requirements of sidewalks shall not apply, provided there is no evidence of special pedestrian activity along the streets involved.

9-02.09-50 [Street Improvements in Existing Platted Areas]

A. Unless otherwise determined in subsection D of this section, no building permit shall be issued for the construction of any new building or structure, or for the remodeling of any existing building or structure which results in an increase in size or change of use, excepting remodel permits for single-family dwellings not resulting in a change of use, unless the applicant for said building permit agrees to construct street improvements which include curbs (Sidewalks and all other frontage improvements required in the design standards for the roadway functional classification), along all city streets that abut the property described in the building permit.

B. The determination of whether the remodeling of an existing building or structure is sufficient to cause the property owner to construct street improvements shall be made by the City Administrator or his/her designee. The City Administrator or designee shall make this determination based upon findings that the increase in building size or change of use results in either:

   1. An increase in floor area which creates the need for additional on-site parking in accordance with the Zoning Code, or

   2. A change in use that results in a need for additional on-site parking, or

   3. An increase in the dwelling unit density on the site, or

   4. A change in the type, number, or location of access ways where off-site traffic will be affected.

C. Notwithstanding any other provisions of this chapter, in cases where the issuance of the building permit pertains to the construction or reconstruction of a building or structure within a large development owned by the same owner or owners, the City Council may, in it s sole discretion, authorize the installation of street improvements of equivalent cost on another portion of the total development area.

D. Street improvements shall be installed according to City standards and shall be completed prior to the issuance of any occupancy permit for the new or remodeled structure or building. In unimproved areas of the city, the City Administrator or designee may determine that a gravel road to city standard is appropriate accompanied by a Waiver of Remonstrance Agreement by the property owner guaranteeing owner participation in future street improvements in the area. ~~may grant a time extension of the provisions of this section, provided that the applicant provides sufficient security in amount and quantity satisfactory to the City Attorney to assure payment of such improvement costs.~~

Table 11-60-1: Required Roadway Design Standards

Street type	Travel lanes	Parking	Bikeways	~~Total Pavement~~	Unpaved Shoulders	Planting Strip	Sidewalks	Right-of-way[1]	Shared-use path[6]
~~Urban (Fig. 2-1 of the TSP)~~									
~~New~~ Gravel Local[1]	2 – 8' ~~9'~~	~~5' Both Sides~~ None	None	~~28'~~	2' ~~5'~~ Both Sides	~~5' Both Sides~~ None	None	20' ~~50'~~	None
Local[1] 40' right-of-way[2] ~~Preferred Retrofit~~	2 – 10' ~~9'~~	~~6~~ 8' One Side	None (see shared-use path)	~~24'~~	None	~~5' Both Sides~~ None	None (see shared-use path) ~~5' Both Sides~~	40' ~~46'~~	11' shared-use path[3]
Local[1] 47' right-of-way[2] ~~Minimum Retrofit~~	2 – 10' ~~9'~~	8' Both Sides	None[2]	~~18'~~	None	None. Planting strip is optional with a shared use path on one side only.	5' Both Sides ~~5' One Side~~	47' ~~25'~~	None
Collector [4] 50' right-of-way	2 – 10'	8' Both ~~One~~ Sides	None (see shared-use path) ~~5' Both Sides~~	~~38'~~	None	6' One Side ~~5' Both Sides~~	None (see shared-use path) ~~6' Both Sides~~	50' ~~62'~~	8' one side
Collector[4] 55' right-of-way	2 – 10'	8' Both Sides	None (see shared-use path)		None	8' One Side	6' one side (opposite the side with the shared-use path)	55'	8' one side
Arterial[5] Downtown Cross-section	2 – 12' ~~11'~~	8' Both Sides[2]	None ~~5' Both Sides~~	~~48'~~	None	4' both sides Furniture zone that includes both vegetation and pedestrian amenities	6' Both Sides ~~10' Both Sides[3]~~	60' ~~70'~~	None
Arterial Non-Downtown Core – 63' right-of-way	2 – 12' with one 14' Median or center turn lane	None	6' Both Sides		None	None	6' both sides	63'	None
Arterial Non-Downtown Core – 75' right-of-way	2 – 12' with one 14' Median or center turn lane	None	6' Both Sides		None	None	12' both sides	75'	None
~~Rural (Fig. 2-1 of the TSP)~~									
~~Local~~	~~2 – 9'~~			~~18'~~	~~2' Both Sides~~			~~30'~~	
~~Collector~~	~~2 – 10'~~	~~6' One Side~~	~~5' Both Sides~~	~~36'~~	~~4' Both Sides~~		~~5' Both Sides~~	~~62'~~	
~~Arterial~~	~~2 – 12'~~		~~5' Both Sides~~	~~24'~~	~~4' Both Sides~~		~~5' Both Sides~~	~~60'~~	

[1] For Local Streets, no parking is allowed within 30' of the curb return
~~Required right-of-way is the total of pavement, shoulders, planting strip, and sidewalks, plus two (2) feet for urban roadways and eight (8) feet for rural roadways.~~
[2] On local streets, bicycles are assumed to be able to share the travel lane or the shared-use path. ~~Standards for Urban Arterials and collectors require eight (8) foot parking lanes in the downtown area, where storefront commercial land uses make on-street parking desirable. The urban and rural standards applications areas are defined by Figure 2-1 of the TSP. Outside of downtown, parking lanes may be excluded from the cross section if adjacent land uses do not support the need (for instance, if buildings are set back from the right-of-way and off-street parking). Where on-street parking is eliminated from the cross section, total pavement width shall be reduced by the same amount.~~
[3] The Shared-use path assumes 1' for curb between the travel lane and the path. ~~The ten (10) foot arterial sidewalk is stipulated for downtown area and may be reduced elsewhere to six (6) feet.~~
[4] For Collector Streets, no parking is allowed within 45' of the curb return
[5] For Arterial Streets, no parking is allowed within 30' of the curb return
[6] Shared use paths should be constructed from asphalt

Comprehensive Plan Amendments to Support the TSP

This section addresses the requirement that the City of Vernonia's TSP update is consistent with the Comprehensive Plan. Existing Vernonia comprehensive plan language appears in plain text. Recommended additions to the Plan are shown as underlined text while recommended deletions to the plan are shown in ~~strikethrough text~~.

Transportation Systems

Transportation System Goals

Operation and Safety

- Preserve and improve the function, capacity, and level of service and safety of the roadway system

Transportation Alternatives

- Support the use of other modes, especially bicycles and pedestrians, including transit
- Support Safe Routes to Schools programming and projects
- Receive input on airport operations and expansion

Finance

- Create a sound fiscal approach to financing transportation system improvements

Public transportation is provided in Vernonia by The Columbia County Rider, a service of the Columbia County Transit Division ~~Transportation (COLCO)~~, which operates Dial-A-Ride and flex route service throughout Columbia County. ~~In an average year COLCO will provide over 130,000 low cost rides to county residents.~~ More than 50% of the small buses, vans, and minivans used by the rural transit system are equipped with wheelchair lifts for the convenience of the county's disabled population. In 2009 the County released *The Columbia County Community-Wide Transit and U.S. Highway 30 Transit Access Plan* (Columbia County, Oregon 2009) that addresses current and future transit needs, and provides direction to the County for planning and implementing transit services, operations, facilities, and funding within a 10-year horizon. Transit goals and objectives should be coordinated with this planning document.

Streets and Roads

The City of Vernonia's major arterial is Oregon State Highway 47 which follows a general south-north alignment ~~routing~~ from McMinnville through Forest Grove and Banks to Vernonia, then north through Mist to Clatskanie. In Vernonia, the highway conforms to the southern portion of Rose Avenue to Bridge Street, along Bridge Street over Rock Creek and the Nehalem River to Mist Drive, then north to the City limits along Mist Drive. Improvement of this highway and its maintenance shall remain the responsibility of the State Department of Transportation subject to coordination with the City to help solve problems related to through traffic of long and other heavy trucks and downtown traffic congestion.

Mist Drive south of the intersection with Bridge Street and continuing along Pebble Creek Road is a ~~State Street and Pebble Creek are~~ county road~~s. Both of these roads act as collector streets.~~ The maintenance of Mist Drive and Pebble Creek Road ~~these roads~~ will be the County's responsibility as they serve the county's network of road circulation.

City streets designated as collectors are Rose Avenue north of Bridge Street, Nehalem Street west of Rose Avenue, ~~Bridge Street west of Rose Avenue, Adams Avenue from Bridge Street to Anderson Park~~ State Street between Highway 47 and the northern City Limits, Louisiana Avenue between Missouri Avenue and the northern City Limits, Knott Street east of Mist Drive, and Cougar Avenue and 2nd ~~Street~~ Avenue connecting to ~~Baker~~ Noakes Road. ~~Knott Street from Highway 47 east is designated as a special combined light industrial-residential service street. Maple Avenue from Adams to Weed and Weed Avenue from Mable to Bridge are designated as special commercial service streets.~~

A complete inventory of City street conditions is contained in Exhibit B, Section G, Transportation. This information should be updated by the City as needed to maintain an up-to-date roadway inventory.

Streets and Roads Policies

1. Continued maintenance of Oregon Highway 47 is the responsibility of ~~by~~ the State Department of Transportation ~~shall be required~~. The City will work with ODOT to ~~obtain~~ improve~~ments~~ ~~to~~ Highway 47 to more safely accommodate heavy truck traffic through the City and alleviate traffic congestion in the downtown area.

2. The City continues to support the Banks-Vernonia Linear State Park as a safe means of providing bicycle/pedestrian/horseback travel along Highway 47 from the south into the City.

3. The City continues to ~~adopt~~ coordinate with Columbia County regarding street and road improvement standards outside the City as a means of ~~insuring~~ ensuring that new and existing roads and streets meet transportation needs of the City of Vernonia.

4. New road and street proposals must be in accordance with requirements of the subdivision ordinance, approved by the city Public Works Director, and

    a. Where the proposed street is in the steep slopes area identified in Exhibit B, Section B, Geologic Characteristics and Constraints, the street shall follow the natural topography to minimize grading, cutting and filling, or

    b. Where the Public Works Director deems it necessary, expert opinion on the street alignment shall be obtained at the developer's expense from an engineer or other qualified professional

5. Requirements for off-street parking and loading and vehicular maneuvering space for all new uses shall be as provided in the City's zoning ordinance.

6. Alternative appropriate uses of unimproved public right-of-way may be recommended to the City Council by the Planning Commission as a part of the approval of any adjacent development.

7. The Planning Commission shall work with downtown business people to review and recommend changes in on- and off-street parking and loading space arrangements in order to better serve the needs of the downtown area.
8. The City shall continue to support Safe Routes to School policies and programs.

Airport

Airport Policies

1. The City will continue to plan for airport improvements designed to provide for increased usage and maintenance of safe operations. Details of projected improvement needs are contained in Exhibit B, Section G, Transportation.
2. Potential for light industrial development in the airport industrial zone established by Columbia County shall be encouraged by the City.
3. Potential for destination resort development in conjunction with the airport and the adjacent City ~~riverside~~ airport park property and the Vernonia Golf Course shall be encouraged by the City.

NOTICE:

This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed, in part, by Federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), local government, and the State of Oregon funds.

The contents of this document do not necessarily reflect views or policies of the State of Oregon.

APPENDIX G

SAFE ROUTES TO NEW SCHOOLS

APPENDIX G

Safe Routes to the new Vernonia Schools at the end of Missouri Avenue was a main focus of the TSP update. The following two documents include recommendations for safe routes to the new schools, and the second document is a white paper that describes various programs that could be used to support schoolchildren who walk and bicycle to school.

Safe Routes to New Schools

PREPARED FOR: Carole Connell, City of Vernonia
Bill Haack, City of Vernonia
Seth Brumley, ODOT

PREPARED BY: Mike Tresidder, Alta Planning + Design
Elliot Akwai-Scott, Alta Planning + Design

COPIES: Larry Weymouth, CH2M HILL

DATE: December 9, 2010

This memorandum provides recommendations for additional safe to the new Vernonia Schools campus site on Missouri Avenue for the Vernonia School District #47J. Current and previously proposed bicycle and pedestrian routes in the area of the Missouri Avenue site are also summarized. The memo is divided into four sections:

- Executive Summary;
- Existing Conditions;
- Vernonia School Campus Access Studies Summary; and
- Safe Routes to New Schools Recommendations

Executive Summary

The key conclusions of this memo are summarized below.

Existing Conditions

- Access to the Missouri Avenue site from the east is challenged by missing sidewalks on Bridge Street (OR 47) east of Spencer Avenue, and a lack of bike lanes and ADA accessibility on the Nehalem River Bridge.
- The existing bicycle and pedestrian path on the southern shoulder of Bridge Street (OR 47) in the vicinity of O-A Hill is substandard, providing an obstacle to access to the Missouri Avenue site from the west.
- There are no existing sidewalks in the immediate neighborhood around the Missouri Avenue site.

Vernonia School Campus Access Studies

- Half (50%) of students inside the Vernonia city limits currently walk or bike to school.
- A previous proposal to bus all students who live west of O-A Hill could increase the number of students being bused by nearly 200. 215 students inside the Vernonia city

limits live west of O-A Hill, but only about 10% of them currently take the bus to school compared to 53% who walk or bike to school.

- Because students living west of O-A Hill represent over 70% of students who currently walk to school, an improved bicycle and pedestrian access across O-A Hill is essential to mitigate impacts on walking and bicycling that may be caused by the relocation of the schools site.

Safe Routes to New Schools Recommendations

- Access to the Missouri Avenue site from the east should be improved by extending bike lanes and sidewalks on Bridge Street (OR 47) east of Spencer Avenue, and by creating a walking and bicycling route along Alabama Avenue.
- Access to the Missouri Avenue site from the west should be improved by bringing the bicycle and pedestrian sidepath on Bridge Street (OR 47) in the vicinity of O-A Hill into accordance to current standards, and by relocating the path to the north side of the street in order to reduce the number of times students cross Bridge Street (OR 47).
- Local access between Bridge Street and the Missouri Avenue site should be provided by dedicated bicycle and pedestrian facilities along both Texas and Missouri Avenues.

Existing Conditions

Overview

Citywide conditions for bicyclists and pedestrians in Vernonia are summarized in Technical Memo #2: Existing Conditions. This section discusses existing facilities within the immediate vicinity of the new Vernonia Schools site in greater detail. Inventoried bicycle and pedestrian facilities near the new Vernonia Schools site are featured in Figure 1.

Existing Bicycle and Pedestrian Facilities

Access to the new Vernonia Schools site is comprised of three distinct segments:

- Bridge Street (OR 47) east of the site;
- Bridge Street (OR 47) west of the site; and
- Local roads connecting the site to the nearby neighborhood and Bridge Street (OR 47).

There is no existing connection between the new schools site and roads such as Mellinger Road to the north of the site.

Bridge Street (OR 47) East of Site

Bridge Street (OR 47) has bike lanes and sidewalks on both sides in the vicinity of the new Vernonia Schools site between Texas Avenue and Spencer Avenue. East of Spencer Avenue, Bridge Street (OR 47) has paved shoulders up to 4 feet wide on either side for 800 feet east to the Nehalem River Bridge. Pedestrians prefer to use the south shoulder in this area due to impaired visibility on the northern shoulder at the bend in the road between Spencer Avenue and Riverside Drive.

Connecting to the west side of the Nehalem River, the Nehalem River Bridge has 5 foot sidewalks on either side, but access to the sidewalks from the Bridge Street (OR 47) shoulder is constricted at the west end of the bridge. Concrete handrails on the outside of the bridge in conjunction with crash cushion barrels on the corner of each sidewalk reduce the clear travelway for pedestrians to less than 3 feet. There are no sidewalks on Mist Drive at the east end of the bridge.

Bridge Street (OR 47) West of Site

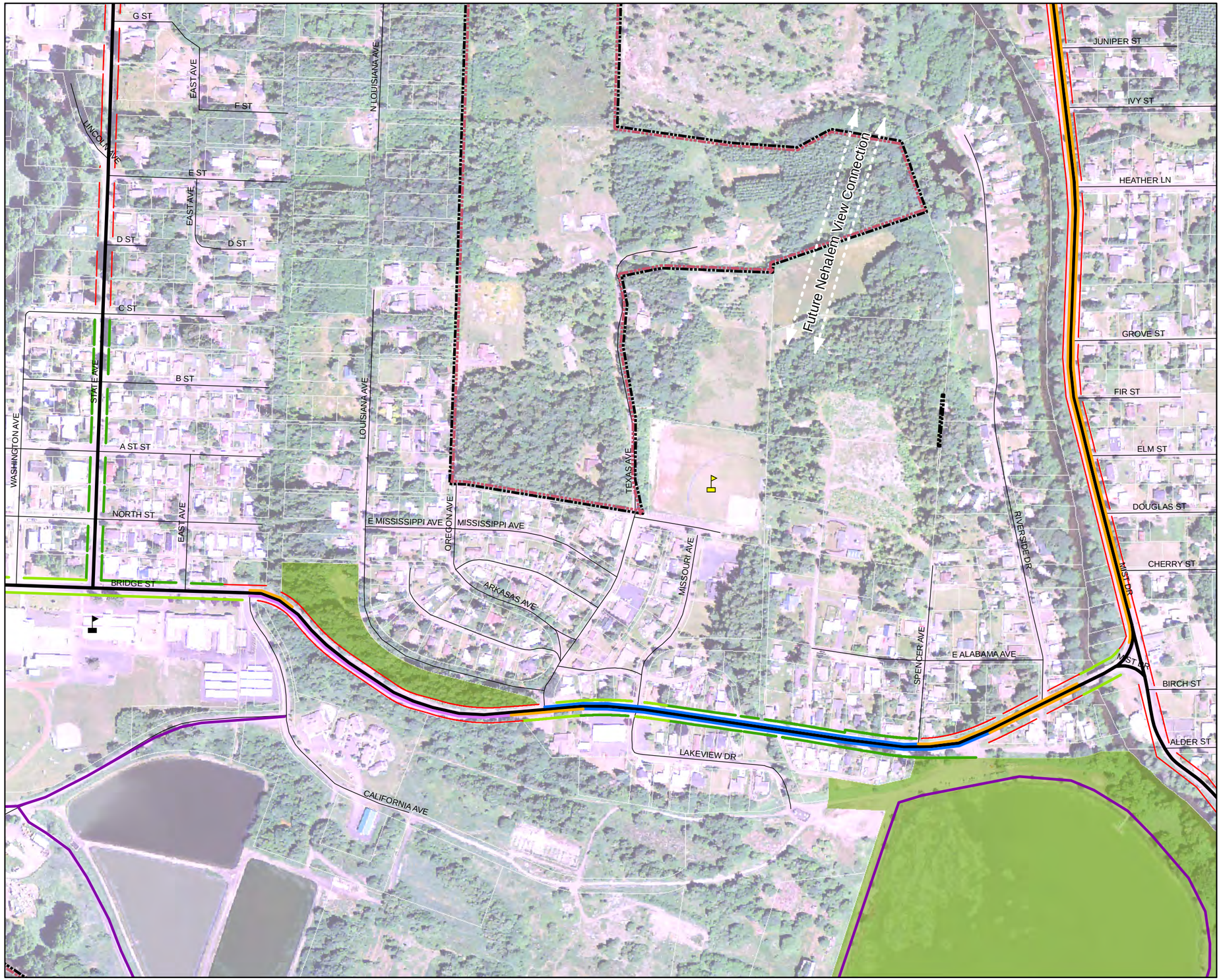
Bridge Street (OR 47) is the only existing street that provides access to the new Vernonia Schools site from the west. However, bike lanes and sidewalks on both sides of Bridge Street (OR 47) end at Texas Avenue. Pedestrians and bicyclists traveling east-west along Bridge Street (OR 47) across O-A Hill use a 6 foot wide shoulder on the south side of the highway, which is separated from the adjacent travel lane by a guard rail. This width is insufficient for bi-directional traffic, when accounting for the necessary shy distance from the guardrail on the north side of the shoulder path and the 6 foot tall chain link fence on the south side. Pedestrians and bicyclists can currently access the shoulder path from the north side of Bridge Street (OR 47) using a crosswalk on the east leg of the intersection of Bridge Street (OR 47) at Texas Avenue. A 150 foot gap separates the end of the sidewalk at Texas Avenue and the guardrail-protected shoulder path, including a 40 foot wide driveway that accesses the Vernonia Pioneer Museum parking lot.

The guardrail-protected shoulder path on Bridge Street (OR 47) around O-A Hill stretches approximately 1200 feet from its eastern end near Texas Avenue to its western end at California Avenue. At the three-leg intersection of Bridge Street (OR 47) and California Avenue a crosswalk on the south leg of the intersection connects the shoulder path to a 10 foot wide attached sidewalk in front of the existing Washington Grade School. One block further west, crosswalks on the east and west legs of the intersection of Bridge Street (OR 47) and East Avenue help bicycles and pedestrians to cross to the north side of the street.

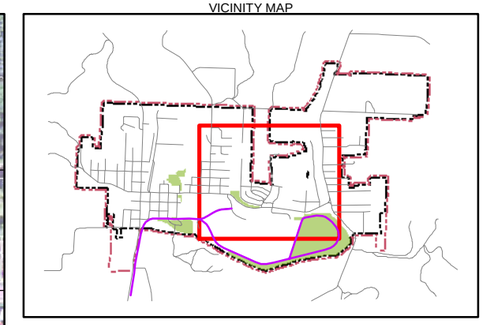
Local Roads

Missouri Avenue, identified as the primary access to the new Vernonia Schools site in the 2010 Transportation Impact Analysis, currently exists as a 22 foot wide roadway with no sidewalks, within a 50 foot right-of-way. Texas Avenue, which is specified as a secondary school access for bicycle and pedestrian traffic as well as an emergency access route, has a similar roadway width and also lacks sidewalks. Texas Avenue widens slightly at its intersection with Louisiana Avenue, just north of Bridge Street (OR 47).

For students living in the immediate neighborhood surrounding the new Vernonia Schools site, local streets such as Louisiana Avenue, Arkansas Avenue, Oregon Avenue, and Mississippi Avenue have similar conditions to Texas and Missouri Avenues, with paved roadways approximately 20 feet wide and no sidewalks. East of Missouri Avenue and west of the Nehalem River, the existing local street network does not connect directly to the school site, requiring bicycle and pedestrian traffic to travel south to Bridge Street (OR 47), traveling west, and then turning back north to reach the school site via Missouri Avenue.



VICINITY MAP



LEGEND

- Existing Vernonia Schools
- Future Site of Vernonia Schools

Bike Facilities Inventory

- Bike Lane
- Shoulder Sidepath
- Shoulder
- Shared-Use Paths

Sidewalk Inventory

- Sidewalk Missing
- Attached Sidewalk
- Detached Sidewalk
- Inventoried Streets (Arterials & Collectors)
- Streets
- Parks
- Vernonia TSP Study Area
- City Limits

Sources:
1. UGB and City Limits - City of Vernonia, 2010
2. Streets - City of Vernonia, 2010

N

0 50 100 200 300 400 500
Feet

FIGURE 1
Existing Conditions
Technical Memo #5
Vernonia TSP

CH2MHILL

Vernonia School Campus Access Studies Summary

This section focuses on the following two documents:

- Transportation Impact Analysis (March 9, 2010); and
- Student Travel Mode Survey Results (December 11, 2008).

Transportation Impact Analysis (March 9, 2010) Summary

Overview

This section summarizes the key findings of the Vernonia School Campus Transportation Impact Analysis (TIA) from March 2010, focusing on school bus and motor vehicle circulation and the proposed bicycle and pedestrian recommendations and routes. The recommendations from the 2010 TIA will be discussed and analyzed later in the memo.

School Bus and Motor Vehicle Circulation Improvements

Bridge Street (OR 47)

- Installation of an eastbound left-turn lane at the Bridge Street/Missouri Avenue intersection (unsignalized).

Missouri Avenue /Texas Avenue

- Elimination of parking on the southbound approach for at least 125 feet north of the Bridge Street/Missouri Avenue;
- Missouri Avenue provides the most direct path to the proposed campus and is free of potential sight distance issues

Bicycle and Pedestrian Recommended Improvements

Bridge Street (OR 47)

- Installation of a pedestrian refuge on the east leg of the Bridge Street/Missouri Avenue intersection;
- Extend the 25 miles per hour speed zone to about 500 feet east of Missouri Avenue;
- Retention of bike lanes on Bridge Street between Texas and Missouri Avenues;
- Installation of a multi-use pedestrian-bicycle path along the south side of Bridge Street between Texas and Missouri Avenues (see Figure 2);
- Staff the Bridge Street crosswalk at Missouri Avenue with crossing guards before and after school, flagging traffic to protect students.

Missouri Avenue /Texas Avenue

- Provide pedestrian and bike facilities along Missouri Avenue between the new school site and Bridge Street (such as sidewalks or a multi-use path) as well as at the Bridge Street intersection (see Figure 2);
- Provide an emergency vehicle and pedestrian-bike connection linking the school campus to Texas Avenue.

Connectivity

- Provide a pedestrian connection from the new school site to the city center of Vernonia (see Figure 2);
- Provide pedestrian-bicycle connectivity from the school campus via local streets to the neighborhood immediately west of the campus (State Street neighborhood) (see Figure 2);
- Provide bus service to all students who reside west of Ora Bolmeier City Park and all students who live greater than one mile from campus;

Student Travel Mode Survey Results (December 11, 2008) Summary

Overview

A travel survey was conducted at the Vernonia School District campus in downtown Vernonia during the week of Monday, November 3rd, 2008. The survey had an 87% response rate.

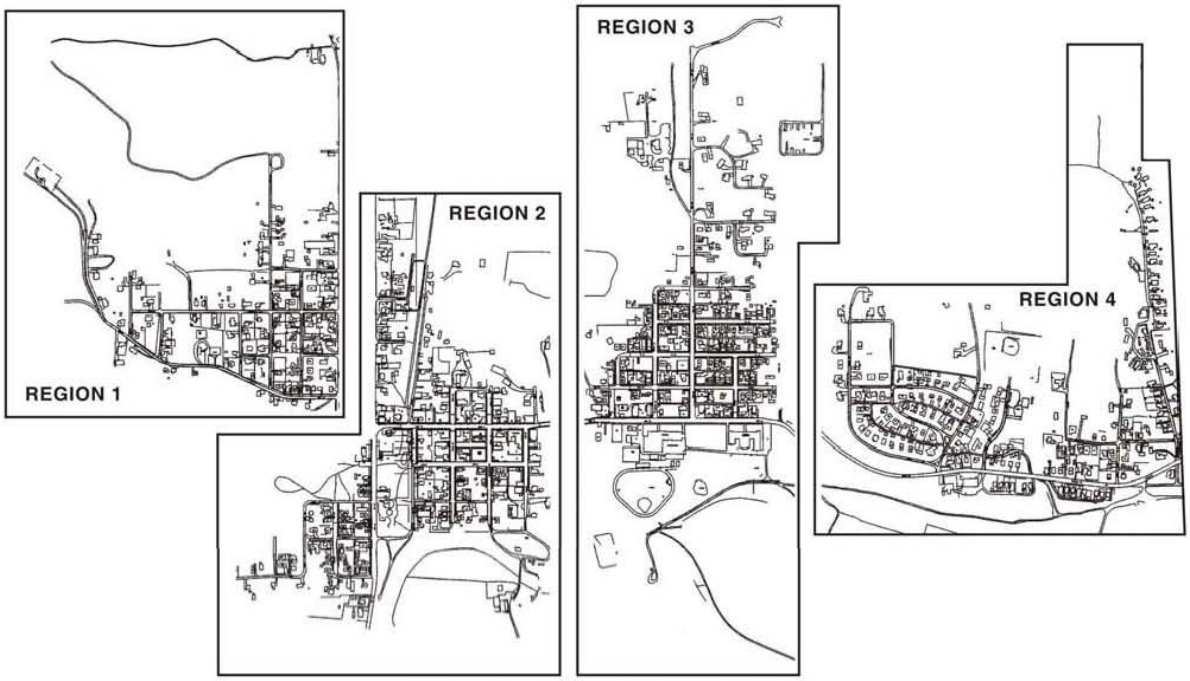
Key Findings

The student travel mode by geographic region is shown in Table 1. The extent of the four regions identified in Table 1 can be viewed in Figure 2.

Table 1. Student Travel Modes by Geographic Regions

Location	Number of Students	Transportation Mode			
		Bus	Car	Walk	Bike
City Region 1	81	12	38	28	3
City Region 2	61	1	21	37	2
City Region 3	73	9	19	43	2
City Region 4	98	17	41	37	3
In Vernonia	***313***	***39 (13%)***	***119 (38%)***	***145 (46%)***	***10 (3%)***
Outside of Vernonia	262	150	105	5	2
Total	**575**	**189 (33%)**	**224 (39%)**	**150 (26%)**	**12 (2%)**

Figure 2. Student Travel Mode Survey Geographic Regions (Source: Kittleson & Associates, *Vernonia School Siting Study Travel Mode Survey Results*, 2008)



Safe Routes to New Schools Recommendations

Travel Mode Survey Analysis

Mode Split

While Table 1 shows that overall the two most common methods of transportation to school are car (39%) and bus (33%), this overlooks some important facts regarding biking and walking to school. As Table 2 below shows, looking at travel behaviors by city region provides a different picture of how students travel to school in Vernonia.

Table 2. Student Travel Modes by Geographic Regions: Non-Motorized Split by Region

Location	Number of Students	Transportation Mode				Non-Motorized %
		Bus	Car	Walk	Bike	
City Region 1	81	12	38	28	3	38%
City Region 2	61	1	21	37	2	64%
City Region 3	73	9	19	43	2	62%
City Region 4	98	17	41	37	3	41%
In Vernonia	313	39	119	145	10	50%
Outside of Vernonia	262	150	105	5	2	
Total	**575**	**189**	**224**	**150**	**12**	

Table 2 shows that nearly two-thirds of students living in city regions 2 and 3 currently walk or bike to school, while the overall transportation mode split of students living in Vernonia is 50%. Furthermore, the Travel Mode Survey notes that the weather during the week of the survey was generally rainy and not conducive to bicycling. This indicates that despite challenging weather conditions, Vernonia students are biking and walking to school at significantly high rates. This walking and bicycling should continue to be encouraged, and providing the appropriate facilities is necessary to support this travel behavior.

Bussing

Recommendations in the TIA included bussing all students living west of Ora Bolmeier City Park. This would cause a dramatic decrease in the number of students who bike and walk to school, and the loss of exercise from time spent walking and bicycling compared to riding the bus could have negative health impacts for the affected students.

In addition to potential health impacts, the rise in the number of students bussed, and consequently the type and number of buses used, would also rise dramatically. The area west of Ora Bolmeier City Park is covered by City Regions 1, 2 and 3 in Tables 1 and 2 above. According to the Travel Mode Survey, approximately 22 students are currently bussed from those three regions. Under the bussing recommendation in the TIA, that number could rise as high as 215 students (all students in those three city regions). If all students in those three regions were bussed, 115 fewer students would walk and bike to Vernonia schools.

Providing the appropriate non-motorized facilities will allow for the continued high rates of walking and biking to school by students while providing facilities that benefit the entire community. Recommended routes are discussed further in the next section.

Bicycle and Pedestrian Connections Analysis and Recommendations

Unless directly noted, all connectivity recommendations in this memorandum are alignment recommendations only, with no associated design. Specific designs will be addressed in Technical Memo #6: Transportation Solutions Report. Previously suggested pedestrian and bicycle access options (not recommended) are featured in Figure 3; the new alignment alternatives discussed in this section are featured in Figure 4.

2009 Transportation Impact Analysis Alternatives

In addition to bicycle and pedestrian facilities on Texas and Missouri Avenues, and a new crosswalk across Bridge Street at Missouri Avenue, the 2009 Transportation Impact Analysis proposed two alternative routes to connect the new Vernonia Schools site to central Vernonia across O-A Hill (Figure 3). Both alternatives would be located north of Bridge Street, and travel east to west over O-A Hill through Ora Bolmeier Park, connecting with either North Street or Bridge Street on the west side of the hill.

Neither of the alternatives proposed in the 2010 Transportation Impact Analysis is feasible. The slope of O-A Hill is up to 40%, climbing over 100 feet in elevation in a short horizontal distance, which would necessitate numerous switchbacks to create a moderate grade for a path crossing the hill. Switchbacks would in turn require extensive cut and fill work and the removal of many trees. These large scale changes to a community park, the loss of natural resource assets and a heavy financial cost make these routes less than desirable alternatives for improving bicycle and pedestrian connections to the new Vernonia Schools site.

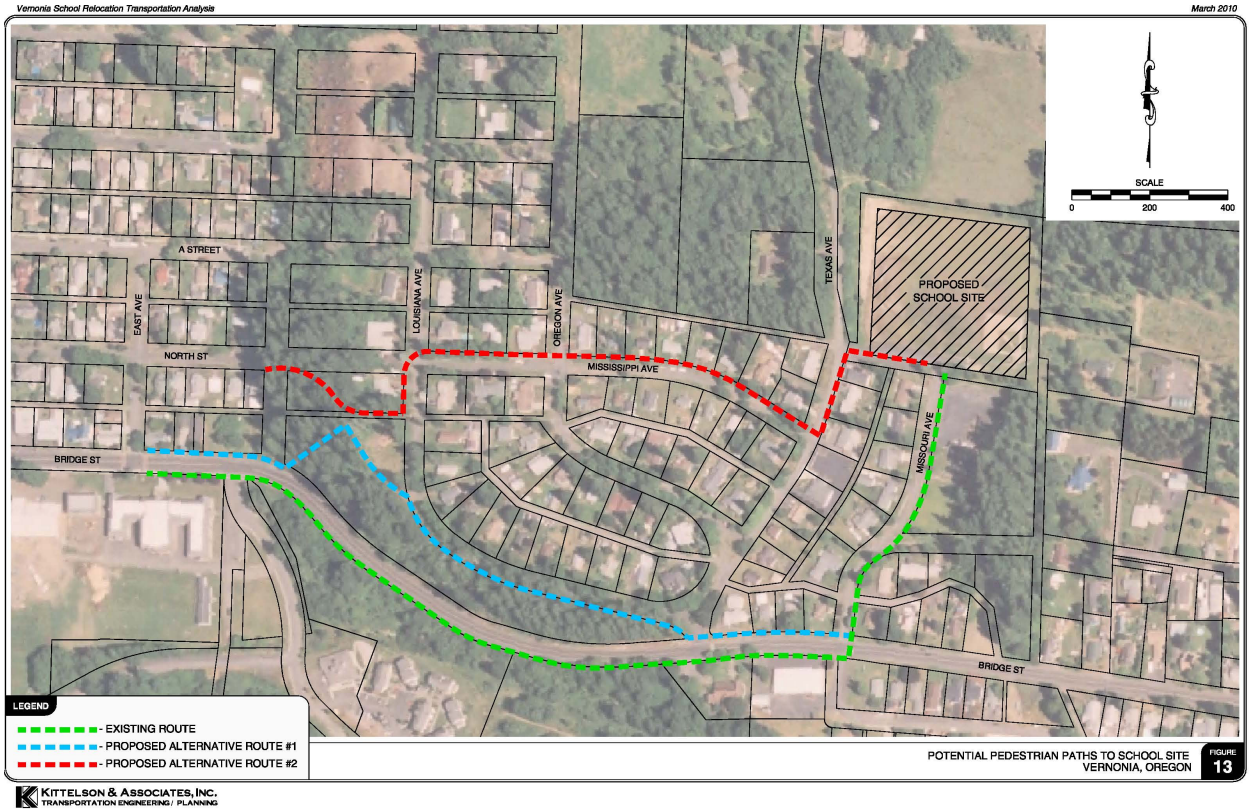
Access from West of O-A Hill

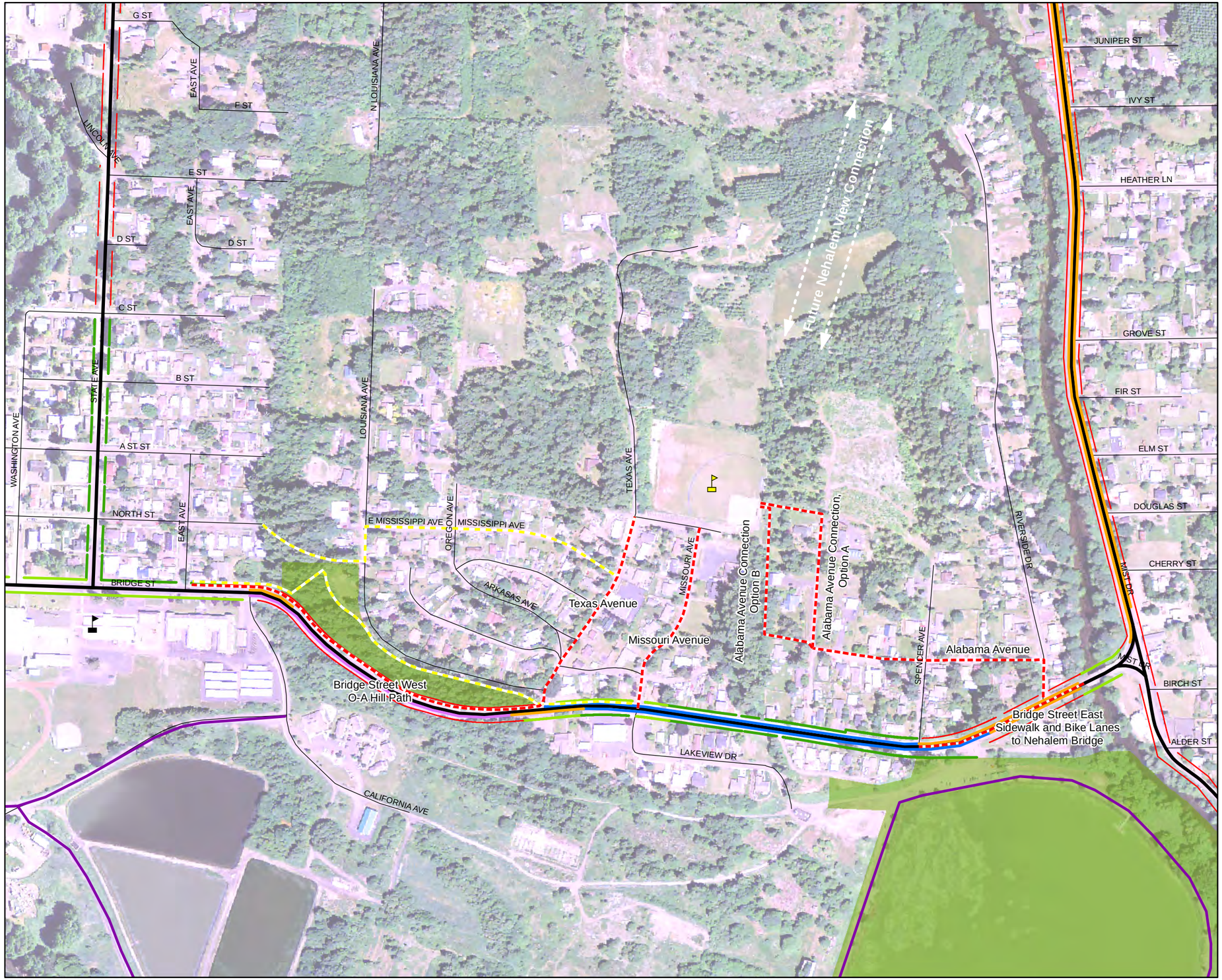
The relocation of Vernonia schools north of Bridge Street will make the existing shoulder sidepath on the south side of Bridge Street less attractive for bicyclists and pedestrians that need to cross O-A Hill. For the majority of students living west of O-A Hill who also live north of Bridge Street, walking and bicycling to and from school using the existing shoulder sidepath would require crossing Bridge Street four times each day. Moving the path to the north side of the street would allow these students to walk and bike to school without ever needing to cross Bridge Street.

Completion of this project would require:

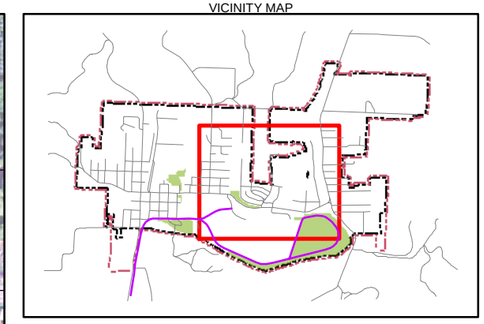
- Expansion of the existing roadway within existing right-of-way on the north side of Bridge Street in order to provide a new path wider than the existing substandard 6 foot width;
- Construction of retaining walls in any locations where cuts are necessary to expand the roadway;
- Construction of a barrier between the new path and the roadway;
- Roadway restriping and construction of a new south side guardrail; and
- Intersection treatments at either end of the new path at Texas Avenue and East Avenue, to facilitate crossing movements and increase the visibility of pedestrians and bicyclists reentering the sidewalk and roadway network.

Figure 3. Previously Proposed Bicycle and Pedestrian Access Options (Source: Kittleson & Associates, *Vernonia School Campus Transportation Impact Analysis*, 2009)





VICINITY MAP



LEGEND

- Existing Vernonia Schools
- Future Site of Vernonia Schools
- Proposed Safe Routes to New Schools
- 2009 TIA Alternatives

Bike Facilities Inventory

- Bike Lane
- Shoulder Sidepath
- Shoulder
- Shared-Use Paths

Sidewalk Inventory

- Sidewalk Missing
- Attached Sidewalk
- Detached Sidewalk
- Inventoried Streets (Arterials & Collectors)
- Streets
- Parks

Sources:
1. UGB and City Limits - City of Vernonia, 2010
2. Streets - City of Vernonia, 2010

N

0 50 100 200 300 400 500
Feet

FIGURE 4
Safe Routes to New Schools
Technical Memo #5
Vernonia TSP

Access from Nehalem River Bridge

Bridge Street Improvements

Construction of new sidewalks could fill the gap in the pedestrian network that currently exists between Spencer Avenue and Nehalem River Bridge. Completion of this project may require cuts into the embankment on the north side of Bridge Street between Spencer Avenue and Riverside Drive. Sidewalks on the north side of Bridge Street will serve the majority of students walking to school who live north of Bridge Street, and who do not need to use sidewalks on the south side of the street in order to travel to school.

For students living east of Nehalem River Bridge, the current lack of bike lanes between Mist Drive and Spencer Avenue is an obstacle to bicycling to school. Extending bike lanes from Spencer Avenue and Vernonia Lake City Park to the Nehalem River will close this gap and encourage students to bicycle to school. The existing shoulders are less than 4 feet wide in some constrained areas; a modest roadway expansion will allow these shoulders to be expanded to 5 feet on the south side and 6 feet on the north side adjacent to sidewalk, to meet the standard width for bike lanes given in the Oregon Bicycle and Pedestrian Plan.

Alabama Avenue

A new route for bicyclists and pedestrians to access the school site following Alabama Avenue (with a connection to Bridge Street via Riverside Drive). This route provides a desirable more direct, lower traffic volume street for non-motorized users that avoids potential conflicts and the higher traffic volumes of Bridge Street.

There are two alignment options available at the west end of Alabama Street:

- Option A - utilizing the existing private road as a non-motorized connection and connecting into the school campus; or
- Option B - connecting through to an unused right-of-way and creating a multi-use path into the school campus.

Access from Texas/Missouri Avenues

Texas Avenue

As noted in the TIA, a pedestrian and bicycle-only connection is recommended connecting Texas Avenue to the school campus. With this connection, and the recommended restricted vehicle access, Texas Avenue becomes an attractive, low-traffic volume alternative to Missouri Avenue for non-motorized users to connect to both the residences above O-A Hill and to Bridge Street.

Missouri Avenue

As noted in several locations in the TIA, improved non-motorized access along Missouri Avenue is necessary to provide multi-modal access to the new school campus. Installing a multi-use trail along the west side of Missouri provides a direct connection from the recommended multi-use path along Bridge Street to the school campus, while avoiding any pedestrian crossings at the Bridge Street/Missouri Avenue intersection.

NOTICE:

This project is partially funded by a grant from the Transportation and Growth Management (TGM) Program, a joint program of the Oregon Department of Transportation and the Oregon Department of Land Conservation and Development. This TGM grant is financed, in part, by Federal Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), local government, and the State of Oregon funds.

The contents of this document do not necessarily reflect views or policies of the State of Oregon.

New Vernonia Schools Campus
Recommended Safe Routes to School Programs

Introduction

Walking and bicycling are key aspects of student travel to school in Vernonia. According to the Vernonia School Siting Travel Mode Study (Kittleson and Associates, 2008), walking is the most common mode of travel to school for students living inside the Vernonia city limit. Approximately 46 percent of students walk to school on a given day. Rates for student bicycling are lower, approximately 3 percent, but may reach levels as high as 10 percent during fair weather months at the beginning and end of the school year.

The high rate of students traveling to and from school on foot and by bike in Vernonia will likely by impacted be the relocation of the school campus from its current location in the center of the city to a new campus at the Boot Site at the existing Spencer Park. In addition to its central location, the current school campus has an adjacent sidewalk network that is among the most complete in the city.

The new Vernonia schools will be located to an area that generally lacks sidewalks. Furthermore, the new school location east of O-A Hill will create a challenge for students living west of O-A Hill. Nearly 70% of students inside the Vernonia city limits live west of O-A Hill, and represent more than 74% of students currently walking to school. The only existing route to access the new school site from west of O-A Hill uses the six foot wide sidepath along the south side of Bridge Street.

Maintaining the historic high rate of trips to Vernonia schools by way of active transportation modes will require a combination of infrastructure improvements and programmatic strategies to encourage students to walk and bike to the new school campus. In addition to the health benefits of encouraging students to walk or bicycle to school, taking steps to limit the number of vehicles picking up and dropping off students will alleviate congestion along Missouri Avenue (which will be the only street providing vehicular access to the campus) as well as Bridge Street (where vehicles may queue waiting for opportunities to turn onto Missouri Ave).

This memo provides a review of potential programmatic strategies for encouraging walking and bicycling to Vernonia schools.

Refer to the 2011 TSP update for short and long-term infrastructure recommendations.

Recommended Safe Routes to School Programs

Because the new school campus will be in a less central location for many Vernonia residents, programmatic strategies will be particularly important for encouraging Vernonia students and parents to maintain the historic trend of students walking and biking to school. This sections provides a menu of recommended programs which encompass education, encouragement, and enforcement strategies related to walking and bicycling at Vernonia schools. Each recommendation includes the target audience, primary staff and partners, key elements of the program, a suggested time frame, and a detailed description. Where available, the recommendations include links to sample programs.

The following strategies are highlighted in this section:

- **Walking School Buses and Bike Trains** – Where adults accompany students on their walk or bike to school, picking up additional students along the way.

- **Stop and Walk Program** - To encourage students to walk or bike part of the way to school when they live too far away

- **Pedestrian and Bicycle Safety Education** – Providing students with in-class instruction on how to practice safe walking and bicycling habits.

- **School Zone Traffic Safety Campaign** – To encourage motorists to drive safely in school zones and along the most common walking and bicycling routes to school.

- **Walk and Bike to School Day** – To celebrate walking and bicycling to school through participation in an annual national event.

- **Walking and Biking Incentive Programs and Friendly Competitions** – To create friendly and fun incentives that encourage students to walk and bike to school.

- **New Drop-off and Pick-up Procedures** – To reduce conflicts between cars and students walking or bicycling to school.

- **Back-to-School Blitz** - To encourage students and parents to start good walking and bicycling habits at the beginning of the school year.

Walking School Buses and Bike Trains	
Target audience	Students and parents
Primary staff	Vernonia school administrators, faculty, and staff; parent volunteers
Partners	Community volunteers
Key elements	Volunteers staff daily 'bus' routes for groups of children who are walking or bicycling to school. The 'bus' picks up students along a regular route at consistent times.
Time frame	Monthly, weekly, or daily during school year
Sample programs	http://www.walkingschoolbus.org/ http://www.saferoutesinfo.org/guide/walking_school_bus/index.cfm

Walking school buses and bike trains escort younger students to school on

With the relocation of Vernonia schools out of the center of town, some parents may feel uncomfortable allowing their children to walk or bicycle alone to or from school. This may be particularly true until additional bicycle and pedestrian infrastructure improvements are made along suggested routes to school. To address this issue, parent volunteers can organize a group of children walking or bicycling to school together in a "Walking School Bus" or "Bike Train." A Walking School Bus is a group of children walking to school with one or more adults. The "bus" follows the same route every time and picks up children from their homes or designated meeting points at designated times. A Bike Train follows the same concept, but the group bicycles to school. The walking patterns of Vernonia lend themselves well to a Walking School Bus or Bike Train, since many students follow similar routes. Walking School Buses or Bike Trains could also begin from locations such as the old school site and the lake parking area.

Children like the Walking School Bus, because it gives them active social time before the school day begins. Adults like the walking school bus, because they feel more comfortable with children walking when there are trained, trustworthy adults accompanying children. Teachers and principals like the walking school bus, because it helps students arrive ready to concentrate on school. Parents offer a level of supervision and protection, and the larger numbers allow the children to be more visible to traffic. Because many parents in Vernonia walk for exercise, they may appreciate and enjoy this opportunity to incorporate additional walking into their own day while spending additional time with their children.

Usually, one parent acts as the organizer, recruiting other parents, neighbors, or community volunteers to walk or bicycle with the children. Older students can also help

lead a bus or train. One parent and one or more older children can take charge of the walking group; this is a great way to engage older students in mentoring younger ones, which helps internalize the behavior for all ages.

Walking School Buses and Bike Trains can include other elements, such as reflective vests for participants, brightly colored t-shirts or other fun ways to help the children feel pride in their bus or train, or parents pulling a wagon with heavy backpacks or large school projects. A Walking School Bus or Bike Train can be as simple as an informal arrangement between a few neighbors or as organized as a school-wide planning effort; it is up to the school and will depend on interest and involvement from parents.

Stop and Walk Program	
Target audience	Students who live too far to walk or bike to school
Primary staff	Vernonia schools faculty and staff
Partners	Parents
Key elements	Encouragement and support to help students walk or bike part of the way to school when they live too far away
Time frame	Ongoing; can be combined with other efforts, such as Walk and Bike to School Day, Walking School Buses/Bike Trains, and competitions and incentive programs
Sample program	http://www.walktoschool-usa.org/

This year-round campaign is designed to encourage parents to stop several blocks from school and walk the rest of the way to school. Not all students are able to walk or bike to school. They may live too far away from school to walk or their route to school may include hazardous traffic situations, such as a major arterial road. This type of campaign is used to allow students who are unable to walk or bike to school a chance to participate in school walking programs.

Stop and Walk programs encourage parents to drop students further from school to promote walking and reduce traffic congestion near school.

This program could be extremely effective in Vernonia for several reasons. First, the new school campus location will result in a longer walk to school for many students. Second, once dedicated walking facilities are provided on Missouri Avenue, the intersection of Bridge Street and Missouri Avenue would be logical stop point that provides students with a short walk to school. Finally, the Stop and Walk Program would reduce the amount of vehicular traffic along Missouri Avenue and directly surrounding Vernonia schools. Reducing the number of motor vehicles in the school environment increases traffic safety, decreases traffic congestion, and improves the air.

To implement this program, designated drop-off points should be established and Stop and Walk should be encouraged along with other walking and bicycling programs

Pedestrian and Bicycle Safety Education	
Target audience	Students in all grades
Primary staff	Vernonia schools faculty and staff; local instructors; local law enforcement
Partners	Parents, community volunteers
Key elements	Age-appropriate curriculum and activities for learning pedestrian and bicycling skills and safety.
Time frame	Twice per year, once in the fall and spring, or ongoing
Sample programs	LAB's Kids I and Kids II curriculum: http://www.bikeleague.org/programs/education/courses.php#kids1 BTA's Bike Safety Education Program: http://www.bta4bikes.org/resources/educational.php

Nearly every child in America can look forward to in-depth training before receiving a driver's license. Pedestrian and bicycle safety are equally important, but most Americans do not receive any training about the rules and responsibilities of using the road as a pedestrian or bicyclist. Pedestrian and bicycle safety education makes sure that each child understands basic traffic laws and safety rules.

Vernonia schools should launch a pedestrian and bicycle safety education program for students. The curriculum can be part of P.E. classes or general classroom education. Local trainers or advocates can lead assemblies, in-classroom activities, and on-road lessons. Vernonia could also choose to recruit local law enforcement for lessons on safety and rules of the road. Bike rodeos, bicycling safety events that include safety checks, lessons, and interactive courses, and mock pedestrian "safety cities" are a great way to put in-classroom education into action before children try their new skills on streets.

Bicycle safety education should include on-bike skills training.

Pedestrian safety education teaches children basic traffic safety rules, sign identification, and decision-making tools. Pedestrian training is typically recommended for first- and second-graders, with refresher courses as students get older, and teaches basic lessons such as "look left, right, and left again," "walk with your approved walking buddy," "stop, look, and listen," and "lean and peek around obstacles before crossing the street." Trained safety professionals can administer pedestrian safety in the classroom or P.E. class. Classroom teachers may use established pedestrian safety curriculum, such as the curriculum taught by the Bicycle Transportation Alliance (see

above) or use online resources, such as the National Center for Safe Routes to School, to develop their own.

Bicycle education should focus on older students (third grade and up) and should include the following:

- Parts of a bicycle
- How a bike works
- Flat fixing
- Rules of the road
- Rules of right of way
- Road positioning
- On-bike skills lessons (braking, turning, steering)
- On-bike community ride

Two excellent model programs are the League of American Bicyclists' Kids I and Kids II classes, and the Bicycle Transportation Alliance's Bike Safety Education Program (see "sample programs" links above for more information). School staff should determine how best to implement pedestrian and bicycle safety education in Vernonia.

Build Walking and Bicycling Education into School Curriculum	
Target audience	Students, particularly older students
Primary staff	School faculty
Partners	School administrators and staff
Key elements	Math, environmental science, and other lessons related to walking and bicycling
Time frame	During school year, as appropriate
Sample programs	National Highway Safety Administration: http://icsw.nhtsa.gov/people/injury/pedbimot/bike/safe-routes-2002/toc.html National Center for Safe Routes to School: http://www.saferoutesinfo.org/guide/education/strategies_for_educating_children.cfm

Class curriculum can be tailored to highlight walking and bicycling, making the connection between active transportation and health, the environment, urban planning, geography, and even math. Examples include mapping safe walking and bicycling routes in geography class, calculating greenhouse gas emissions saved by not driving in math class, or discussing the benefits of walking and biking in health or environmental lessons. Lessons should be grade-appropriate. Sample lesson

The benefits of walking and bicycling can easily be incorporated into classroom curriculum.

plans are available at the sample program websites listed above.

School Zone Traffic Safety Campaign	
Target audience	Parents, bus drivers, general public
Primary staff	Vernonia school administrators, faculty, and staff
Partners	Students, parents
Key elements	Awareness and education campaign including signs, backpack mail, pledges, etc.
Time frame	Can vary: in tandem with policy changes, at the beginning of the school year, in conjunction with special events
Sample program	http://www.traffictamers.com/school.htm

A School Zone Traffic Safety Campaign at Vernonia schools would help create awareness of students walking and bicycling to school. A safety campaign is an effective way to reach the general public (those affiliated with the school and those not) and encourage drivers, including parents and bus drivers, to slow down and look for students walking and biking to school.

A School Zone Traffic Safety Campaign uses signs and banners located near schools (for example, in windows of businesses, yards of people's homes, and print publications) to remind drivers to slow down and be careful in school zones. The campaign can also include a pledge for parents and bus drivers to take (like the one that is part of the Traffic Tamers program, link above). The pledge commits parents and bus drivers to driving slower in school zones and can help educate parents about new policies such as drop-off/pick-up procedures. The campaign can kick off at the start of each school year or in conjunction with special events or policy changes.

Large banners with memorable catch phrases can be hung over or along roadways near schools cautioning traffic to slow down, stop at stop signs, or watch for students in crosswalks.

Walk and Bike to School Day

Target audience	Students and their parents
Primary staff	Vernonia schools administration, faculty, and staff
Partners	Parents, local volunteers
Key elements	Activities to celebrate walking and bicycling to school
Time frame	Annually
Sample program	http://www.walktoschool-usa.org/

Walk and Bike to School Day is a special event encouraging students and parents to try walking or bicycling to school. The event can be celebrated for one day, a week, or an entire month, and can be part of International Walk to School Day, a major annual event in October that attracts millions of student participants in over 30 countries.

Walk and Bike to School Day creates excitement around active transportation.

Walk and Bike to School Day can include contests and prizes for students who walk and bike, special events such as celebrity guests, mascots, or assemblies, and celebrations, such as class parties. The event can be promoted through press releases, articles in school newsletters, and posters and flyers for students to take home and circulate around the community. Walk and Bike to School Day can also be a great opportunity to host or launch other walking and bicycling activities like the ones recommended below, such as safety assemblies, competitions, or campaigns.

Walking and Biking Incentive Programs and Friendly Competitions	
Target audience	Students
Primary staff	Vernonia school administrators, faculty, and staff
Partners	Parents
Key elements	Individual, classroom, or grade level incentives and rewards for walking and bicycling to school
Time frame	One-time or ongoing

Contests and incentive programs reward students by tracking the number of times or how far they walk or bike to school. Contests can be individual, classroom competitions, or grade level competitions. Local businesses may be willing to provide incentive prizes for these activities. Students and classrooms with the highest percentage of students walking or biking compete for prizes and "bragging rights." Small incentives, such as shoelaces, stickers and bike helmets, can be used to increase participation.

Each of the examples of programs below can be modified for students who live too far away from school to walk or bike. Modification can include walking or biking at lunch time or gym class, counting the miles walked or biked with parents and guardians outside of the school day, or getting dropped off within walking distance of school and walking with their parents the last several blocks. Vernonia faculty and staff, with support from parent volunteers, should launch one or more of the following in incentive programs.

School Walking or Mileage Clubs

Children are issued tally cards to keep track of "points" for the each time they walk, bike, bus or carpool to or from school. When they earn a specified number of points they get 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.

Pollution Punchcard

This year-round program is designed to encourage school children and their families to walk and bike. Every time a student walks or bikes to school, a parent volunteer or school representative stamps the card. Then students receive a reward when the punch card is complete.

Example of a Pollution Punchcard

Golden Sneaker Award

Each class keeps track of the number of times the students walk or bike to school and compiles these figures monthly. The class that has the most participation gets the Golden Sneaker Award. The award can be created by taking a sneaker, mounting it to a board like a trophy, and spray painting it gold.

Walk Across America

This is a year-round program and is designed to encourage school children to track the number of miles they walk throughout the year. Students will be taught how to track their own mileage through learning about how many steps or blocks are in a mile and will also learn about places in the United States on their way. Teacher or volunteer support is required.

Each of these programs can use incentives to increase participation and reward the students for their efforts. Examples of incentives include shoelaces, reflective zipper pulls, bicycle helmets, raffle tickets for a bicycle from a local bike shop, early dismissal, extra recess time, or pizza parties.

New Drop-off and Pick-up Procedures	
Target audience	Parents, students, bus drivers
Primary staff	Vernonia school administrators
Partners	Vernonia schools faculty and staff, parent groups
Key elements	New procedures for cars and buses to improve safety for those walking and bicycling and to reduce congestion
Time frame	Beginning of school year

The following procedure options improve safety for all students. Vernonia schools should consider all of them and implement the procedure(s) most appropriate for the school's layout and current issues. Implementing policies can often be very low cost, although they may involve staff resources, and new procedures may take some time to gain acceptance.

Older students assist with the drop-off process.

Parent Drop-off/Pick-up Loop

The establishment 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 be either a dedicated lane just for pick-up/drop-off, or a portion of the larger parking lot that has been marked with cones to serve as the pick-up/drop-off loop. Having supervisors present can help to ensure that loading/unloading moves forward smoothly, efficiently and safely.

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 traffic flow. The valet system eliminates the need for parents to get 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 7th or 8th graders help younger students. However, student volunteers must get out of class early to prepare for pickup.

A supplement to the valet system is a nameplate in the vehicle window that identifies what student needs to be picked up. This allows the valet to find students and bring them to the vehicle as it arrives.

Platooning Drop-off/Pick-up System

In a platooning system, all vehicles are unloaded/loaded simultaneously, then proceed 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 the unloading/loading, then follow it out of the loop. This tool is best used to control the parent inclination to always drop-off and pick-up the student directly in front of the school. Often additional curb loading is available downstream of the school and is severely underutilized, creating excess congestion and delay prior to entering the lot. 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.

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 the buses that might be parking there at one time. Sometimes it is possible to stagger the arrival times of the buses, thus requiring less space. The zones must be clearly marked and there should be adequate sidewalk space for students to wait for the bus.

The cones mark the dedicated bus zone.

Staggered Bell Times

Staggered bell times can help to disperse the traffic peak at schools with a large student population or when two or more schools are in close proximity to one another. 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 the 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, staggering the bell times can be coordinated

among two or more schools to ensure that significant levels of vehicles do not use competing transportation facilities simultaneously.

Early/Late Departure for Walkers and Bikers

Vernonia schools could develop after school clubs for students that walk and bicycle to school to encourage these students to travel home after the traffic associated with parents picking their children up from school has passed. Care should be taken to ensure the after school activity is fun (i.e., at the playground) so it is not seen as a punishment. The primary consideration for this type of activity will be identifying school staff or volunteers to supervise students after the school day. Alternatively, as a part of a managed pick-up program, students walking or bicycling home could be allowed to begin their journey home five minutes in advance of the students being picked up by car.

Back-to-School Blitz	
Target audience	Incoming and returning parents and students
Primary staff	School administrators, faculty, and staff
Partners	Law enforcement; interested parents
Key elements	Distribution of suggested route maps and other helpful resources; walking and bicycling events and incentives; traffic enforcement activities
Time frame	Annually

Families set transportation habits during the first few weeks of the school year, and families are often not aware of the many walking and bicycling resources available to them. Because of this, most families will develop the habit of driving to school. A "Back-to-School Blitz" can be used at the beginning of the school year to promote walking, bicycling, taking the bus, and carpooling as school transportation options.

The Back-to-School Blitz includes many of the other programs recommended here, including suggested route maps, information about Walk and Bike to School Day in October, and tips and resources for starting walking school buses or bike trains.

The main goal of the Blitz is to provide parents with information and resources so that they can choose their travel options wisely. To this end, each family receives a packet containing information about school transportation options, including:

- A letter signed by the principal encouraging parents to create transportation habits with students that promote physical activity, reduce congestion, increase school safety, and improve air quality

- Suggested route to school maps that include bicycling and walking routes and other important information specific to the school, such as drop-off/pick-up procedures and bus information
- Tips on how to start a Walking School Bus or Bike Train
- Pledge forms so parents and students commit to reducing the number of times they drive to school
- An incentive gift such as reflective stickers to attach to backpacks or a sticker or window decal to show their support for walking and bicycling

In addition to the packet, the following strategies can be included:

- A table at back-to-school night with materials and trained volunteers who can answer questions about transportation issues
- An article in first school newsletter about transportation options and resources
- The kick-off of organized walking school buses/bike trains or school competitions, as described above
- Enforcement activities with help from local law enforcement, such as school zone speed and crosswalk enforcement
- Strict enforcement of parking and drop-off/pick-up policies during first month of school (and throughout the year if possible)

TBG053111144220PDX 410377.04.04