OREGON CITY

Transportation Advisory Committee

625 Center Street | PO Box 3040 | Oregon City OR 97045
Ph: (503) 657-0891 | Fax (503) 657-7892

Members:
Mary Smith, Chair
Betty Mumm, V. Chair
Jonathan David
Scott Failmezger
Ronald Haas
Betty Schaafsma
Don Slack
Nancy Walters
Terry Wright

AGENDA

TUESDAY, MAY 18, 2010
6:00 pm
City of Oregon City
City Hall
625 Center Street, Oregon City
Commission Chambers

I. CALL TO ORDER

II. ROLL CALL

III. APPROVAL OF MINUTES

April 20, 2010 (*David, Haas, and Wright absent*)

IV. AGENDA ANALYSIS

V. BUSINESS

A. **Welcome New Member – Scott Failmezger**
B. **Pearl Street Traffic Concerns** (*Update - Lewis*)
C. **Regional Transportation Plan** *(Update)*
D. **Downtown Parking Committee** (*Update - Slack*)
E. **Light Rail to Oregon City** *(Discussion)*
   Discuss ways to potentially meet with Metro or other appropriate parties to ensure it is known that Oregon City is interested in supporting light rail. Also, work to support accommodations that can be planned on current and future projects to facilitate future light rail.
F. **Curb Extension signage for Bicycle Safety** (*Discussion – Nancy Walters)*
G. **TSP Update** *(Update – Lewis)*
H. **2009 Pavement Maintenance Annual Report** *(Update – Lewis)*
I. **Pavement Management Program Budget Options Report** *(Information)*
J. **Washington/12th Streets Intersection Analysis** *(Information)*
K. **Transportation Construction Projects** (*Updates if Appropriate*)
   1. **Warner Milne Rd., Molalla Avenue to Beavercreek Road**
   2. **Holcomb Boulevard Pedestrian Improvements**
   3. **Downtown Sidewalk Replacement Project**
   4. **The Jughandle**
   5. **10th Street/Singer Hill Road UPRR Crossing Improvements**
   6. **Intersection Improvements on Molalla Avenue at Beavercreek Road**

7. PMUF Projects

L. Future Agenda Items

VI. FUTURE AGENDA ITEMS

VII. ADJOURNMENT

Next Meeting: ***June 15, 2010 (third Tuesday)***

Attachments:

1) Minutes for April 20, 2010
2) Photos of Curb Extensions and Signage Examples (5 pages)
3) 2009 Pavement Maintenance Annual Report
4) Pavement Management Program Budget Options Report (Excerpt)
5) Washington Street/12th Street Intersection Analysis

City Staff:

Nancy J.T. Kraushaar, City Engineer/Public Works Director
Aleta Froman-Goodrich, Senior Project Engineer
John Lewis, Operations Manager
Jim Burch, Operations Street Supervisor
Kathy Griffin, Administrative Support

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Transportation Advisory Committee Web Site
http://www.orcity.org/cityrecorder/transportation-advisory-committee
Complete Agenda Packets and Minutes available

Transportation Advisory Committee Minutes

April 20, 2010

I. CALL TO ORDER

The Transportation Advisory Committee meeting of **Tuesday, April 20, 2010**, was called to order by Chair Smith at 6:06 PM in the Commission Chambers at Oregon City Hall, 625 Center Street, Oregon City, Oregon.

II. ROLL CALL

Committee members present included Chair Mary Smith, Vice-Chair Betty Mumm, Don Slack, Nancy Walters, and Betty Schaafsma. Ron Haas, Jonathan David and Terry Wright were excused.

Staff members present included Nancy J.T. Kraushaar, City Engineer/Public Works Director; John Lewis, Operations Manager; and Kathy Griffin, Administrative Assistant.

III. APPROVAL OF MINUTES

Betty Mumm moved to approve the minutes of March 16, 2010. Nancy Walters seconded the motion and it **carried** with Mary Smith, Betty Mumm, Don Slack, Nancy Walters and Betty Schaafsma voting yes. Ron Haas, Jonathan David and Terry Wright were not in attendance.

IV. AGENDA ANALYSIS

Don Slack asked for an update on light rail to Oregon City.

V. BUSINESS

A. Pearl Street Traffic Concerns

John Lewis explained that City crews will be doing some restriping on Pearl Street because the perception by drivers is that there isn't enough room for two lanes of traffic when vehicles are parked on the shoulder adjacent to 221 S. Molalla. The restriping will involve leaving the southerly double yellow line in place, removing the northerly line and painting a new line south of the remaining line. When the new line is painted, it will be painted tighter to the

existing line resulting in an increase in lane width.

It was noted that a traffic study had been requested for Pearl Street and it wasn't clear what could be done to the roadway once the study results were available. Betty Mumm mentioned that the results of the study could possibly be more ammunition to support a roundabout at Division/Molalla/7th.

B. Beavercreek Road School Zone

Mr. Lewis noted that the issue had been on the agenda for a long time and although most people won't be completely happy with the results, a decision had been reached. He outlined what had been done including a speed study by Clackamas County who recommended that the school speed zone be removed. The City also had DKS Associates do a transportation engineering traffic signal analysis at the intersection of Glen Oak Road and Beavercreek Road. Also reviewed was on-site maneuvering at the high school and review of the pedestrian activity along Beavercreek Road which showed that pedestrian numbers were very low.

All of the information led towards strong support for removal of the school speed zone; however, during a recent meeting at which Nancy Kraushaar, John Lewis, Jim Burch and school district staff met, school staff said that the issue wasn't about pedestrians but about teenage drivers. The school district felt that with all the school's "new drivers", oftentimes with passengers, that abdicating for anything but reducing the speed zone was wrong and could have fatal consequences. Also, even though the school district agreed to pay for a flashing school zone light, the County said it was an inappropriate use and was not in favor.

In the end, the "do nothing" option was determined to be the best option. The County has now asked that the City prepare a letter requesting that the State of Oregon withdraw the results of the speed study.

C. Flashing Light at South End and Warner Parrott Roads

The flashing signal has been installed and there are 4 way flashers.

D. Warner Milne Road/Beavercreek Road Pedestrian Movement

Information only.

E. West Linn Solar Highway Open House

Information only.

F. Guidelines for Approving or Denying Stop Sign Requests

Mr. Lewis explained that City staff would be meeting to establish new guidelines for when a stop sign would be appropriate at an intersection such as when a local street intersects with a neighborhood collector or higher classification street.

TAC members pointed out that they had already prepared a Stop Sign Brochure.

G. 2010 Proposed PMUF Projects

Mr. Lewis reported that City staff and the City's engineering consultant looked at both Division Street and Leland Road/Meyers Road between Warner Milne and Frontier Parkway for overlays in 2010. It was determined that although Division Street is a high priority, the project would require a much more comprehensive approach than the City could have done in 2010. Division Street requires utility line replacements, private utility work, and deep road section work. Instead, the City would concentrate on having portions of Leland Road and Meyers Road overlaid which was also a high priority.

Additionally, slurry seals would be applied on select streets and a chip seal application was planned for Linn Avenue in front of Mt. Pleasant Elementary School and on Warner Parrott between South End Road and the school.

H. Regional Transportation Plan

Ms. Kraushaar noted that the regional RTP for the Metro region has been released for public comment. She talked about her involvement in the process. An active transportation component in the RTP was to get alternate modes of travel for all ages such as bike and pedestrian modes.

She advised the TAC that if they want to see just the Oregon City projects to let her know and they could be sent out.

Nancy Walters asked about the Oregon City Loop Trail and an additional pedestrian overcrossing to Gladstone/Portland on the east side because one was not enough. She agreed to send her specific concerns to Nancy Kraushaar for her response.

Ms. Kraushaar noted that communities were being encouraged to prepare for high capacity transit.

I. Downtown Parking Committee

Scott Archer sent Don Slack an e-mail which Mr. Slack read into the record.

J. Transportation Construction Projects

a. Warner Milne Rd., Molalla Avenue to Beavercreek Road

Mr. Lewis gave an update on the problems that the contractors have run into on the project that has delayed its completion.

b. Holcomb Boulevard Pedestrian Improvements

The project was almost complete with the contractor originally waiting for the relocation of a PGE pole. The contractor was now waiting for Qwest to relocate their utility lines so that PGE could remove the old pole.

As a result of all the delays with utility companies, the City was reviewing franchise agreements to see if the City can have more control over private utility projects.

c. Downtown Sidewalk Replacement Project

The project is at 95% design but underground fuel tanks are a concern and there were some contaminated soils. The consultant was in the process of doing a study on luminaries and what would be most appropriate for downtown.

d. The Jughandle

Right of way acquisition was almost complete. The biggest roadblock facing the project is the overpass over the railroad which will not be as wide as hoped for by ODOT so the City has to apply for design exceptions.

e. Downtown Tunnel

Don Slack is on a committee working on getting the 99E tunnel rehabbed. Many people would like to see some clean-up and maintenance completed.

f. Singer Hill UPRR Emergency Repairs

The project was out for bid with proposals due on May 6, 2010.

K. Future Agenda Items

Light Rail– TriMet to interface with City to determine where light rail might come in Oregon City
Curb Extension signage for Bicycle Safety
TSP Update

VI. ADJOURNMENT

There being no further business, the meeting adjourned at approximately 7:49 p.m.

Respectfully Submitted,

Kathy Griffin
Administrative Assistant

A video recording of this meeting is available at http://www.orcity.org/cityrecorder/meeting-agendas-minutes-and-videos.

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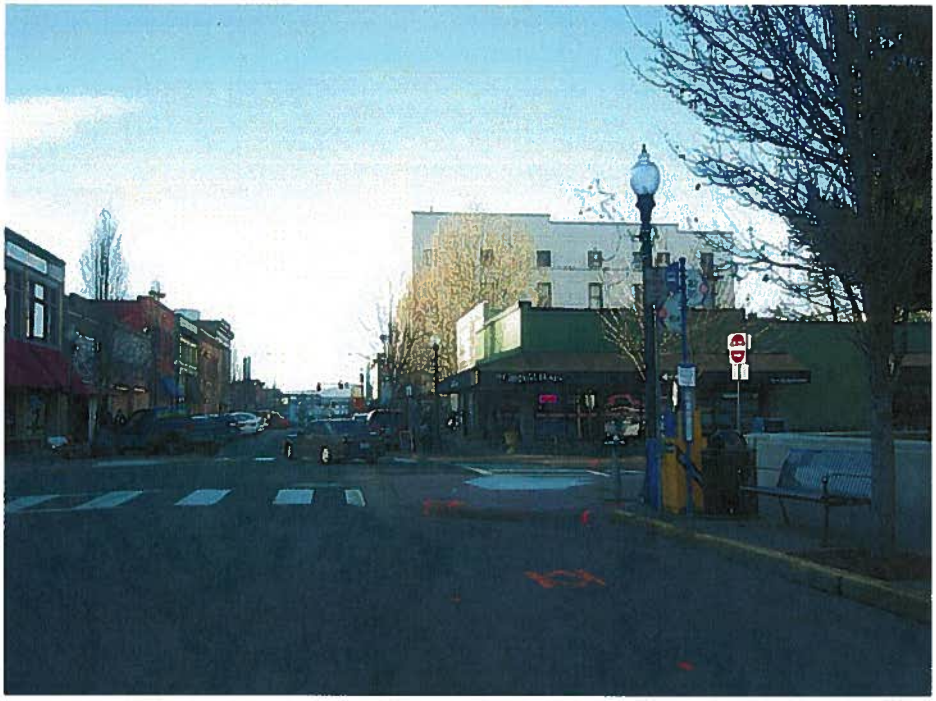

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Oregon City Public Works Department

Pavement Maintenance Utility Fee

Oregon City's Pavement Maintenance Utility Fee was adopted on May 21, 2008. In accordance with Ordinance 08-1007 that established the fee, the City must publish an annual report which is available below.

Related Information

- 2009 Pavement Maintenance Utility Fee Report
- 2008 Pavement Maintenance Utility Fee Report
- Ordinance No. 08-1007 (Establishing PMUF)
- Pavement Maintenance Management Program Report, April 2010
- Pavement Maintenance Management Program Report, Appendix, April 2010
- PMUF - Frequently Asked Questions

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Operations Phone:	(503)657-8241
Operations Fax:	(503)650-9590
Contacts:	View

Latest News

Oregon City opens Riverfront Bc
Amtrak Station moved!
Geogrid Paving System
Cone Zone Awareness! National Zone Awareness Week
Downtown Circulation Study

Upcoming Event:

Transportation Advisory Comm Tue, May 18th 6:00pm
Willamette Terrace Dedication

2009 Pavement Maintenance Annual Report

Oregon City Public Works
Operations Center
122 S. Center Street
Oregon City, Oregon 97045

April 2010

Preserving our past – building our future

Prepared by:

John Lewis, P.E., Public Works Operations Manager
Jim Burch, Public Works Street Supervisor

2009 Pavement Maintenance Utility Fee Annual Report

Purpose for an Annual Report

In accordance with Ordinance No. 08-1007, which established City Code 13.30, Transportation Utility Fees (TUF):

> *"City staff shall prepare an annual report that presents how revenues were spent."*

For consistency and to better align the name of the fee with the purpose, throughout the remainder of this report the TUF will be referred to as a Pavement Maintenance Utility Fee (PMUF).

Background

Oregon City has 138 miles of surface streets with a reconstruction value of approximately $1 million per mile. Transportation funding is one of the most challenging issues facing public agencies. In the past, Oregon City has used State gas taxes and road transfer revenues to provide limited maintenance of the City's street system. Historically, the City's pavement maintenance liability far exceeded the amount available for use from these revenue sources.

In 2007, the City Commission asked the Public Works Department and a Transportation Funding Study Citizens Committee to identify and establish a sustainable funding source for street maintenance. The Committee concluded that a PMUF is the most equitable and stable source for street funding.

Pavement overlay on South End Road

City crews making street repairs

They recommended an annual revenue goal of $1.5 million to at least maintain the City's average Pavement Condition Index (PCI)[1]. The City Commission decided that this target be gradually phased in over a 5-year period to allow customers time to incrementally budget for the fee. With this phased in fee scenario, first year fees could provide $600,000 and jump-start the City's pavement maintenance program.

On May 21, 2008, the City Commission approved Ordinance No. 08-1007 establishing the PMUF. The purpose of the fee was to provide cost recovery for maintaining and operating Oregon City's transportation system. The fee was based on actual cost projections from the StreetSaver Pavement Management software (model). Like those in many other Oregon communities, the fee is also based on nationally recognized information developed by the Institute of Traffic Engineers that estimates the average number of vehicle trips generated by a property based on how that property is used.

StreetSaver Pavement Management System

Documentation of pavement history including inspections, maintenance, and cost scenarios are examples of the kinds of information recorded in the City's StreetSaver software (database). Each street is split into one or more segments and tracked as an asset along with the maintenance history of the segment. Oregon City has been collecting inspection history since 1983. In both 2008 and 2009, the maintenance work completed for both years was added to the StreetSaver Pavement Management System. A PMUF map showing 2008 and 2009 major pavement maintenance accomplishments is attached as Exhibit A.

A Billable Unit Rate

In order to meet the annual revenue goal of $1.5M, the residential monthly unit rate, applied to single family residential land uses, was established at $1.15 per adjusted average daily trip. The monthly non-residential unit rate, applied to all other land

[1] Pavement Condition Index (PCI), developed by the United States Army Corps of Engineers, is based on a visual survey of the pavement and a numerical value between 0 and 100 to define the condition with 100 representing excellent pavement.

uses, was established at $0.189 per adjusted average daily trip. For Fiscal Years '09/'10 through '12/'13, the fee will continue to be phased in to help ease the impact of this new fee. The schedule of the phased in fee (with inflation included) follows:

Table 1 – PMUF Rates

Time Period	Residential Monthly Rate	Residential Rate per Trip	Non-Residential Rate per Trip
July 1, 2008 through June 30, 2009	$4.50	$0.470	$0.077
July 1, 2009 through June 30, 2010	$6.00	$0.627	$0.103
July 1, 2010 through June 30, 2011	$7.50	$0.784	$0.129
July 1, 2011 through June 30, 2012	$9.00	$0.940	$0.154
July 1, 2012 through June 30, 2013	**$11.20**	**$1.172**	**$0.192**

Actual revenues collected for the first year of fee implementation (2009) was $605,650. Fees collected for the first eight months of the second year of the program are $697,000 which puts the City on track for a second year revenue projection of $971,000.

Rates and Rate Types

Adoption of the PMUF established a rate structure providing for a variety of parcel types. The rates for single family residences are a straight-forward unit rate per each parcel. Multi-family housing rates were a similar calculation. The monthly fee for schools is computed based on the number of students which varies based on enrollment.

All other developed parcels have a monthly fee based on the non-residential unit rate and then considering factors of estimated daily trips, and square footages of buildings. There are approximately 575 non-residential customers.

Oregon City's Transportation System

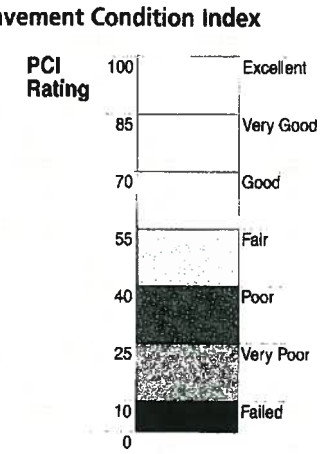
Within the city limits, the transportation system is comprised of multiple jurisdictional responsibilities. The following table provides a history and summary of the mileage obligation of each jurisdiction:

Table 2 – Transportation System Inventory

Year	City	County	Private	ODOT	Grand Total
2006 Miles (12/2006)	132.7	10	8	11.4	**162.10**
2007 Miles (12/2007)	135.03	11.94	9.93	12.48	**169.38**
2008 Miles (12/2008)	136.16	13.46	9.54	12.57	**171.73**
2009 Miles (12/2009)	137.91	13.29	10.07	12.45	**173.72**

Oregon City's Pavement Condition Index

In June 2007, the City completed a pavement condition survey, reviewing the condition of portions of all Oregon City streets. Historically the City has completed this evaluation every three years. Oregon City has been collecting inspection history since 1983. The pavement condition survey is a detailed field assessment of a minimum 10% representative sample of each street segment. This survey information is compiled within the StreetSaver system where a computation is run to establish a City wide Pavement Condition Index (PCI).



In 2007, the overall city-wide average PCI was rated as a 68. In March, 2010, the City completed a new pavement condition survey and the overall citywide pavement condition index is rated as a 61. This reduction in PCI is an indication that the deterioration of Oregon City's pavement system continues to exceed the rate of repair. It also is an indication that the City has a backlog of maintenance needs which have progressed into a condition that will require higher cost repair work.

2009 PMUF Accomplishments

Preventive Maintenance

Preventive pavement maintenance treatments are surface treatments that are applied early in the life of the roadway to prolong the life of the surface. The objective of preventive maintenance is to add a protective coating on top of the existing surface to keep surface water from seeping through the small cracks into the underlying base rock or native soil. Crack sealing, slurry sealing, and chip sealing are the traditional types of preventive maintenance used in our region.

During the fall of 2009, the slurry seal program included 37 individual street segments which were scattered throughout Oregon City. In total, 4.25 miles of streets were surface treated as part of this program. In-house crews prepared the streets in the spring and early summer months of 2009 by cleaning and sealing all surface cracks prior to the slurry seal application. A slurry seal contractor later applied the slurry sealing materials.

Preventive maintenance project locations and segment details for 2009 are included in table form as Appendix A, and shown in map form as Exhibit B.

In-House Pavement Maintenance and Street Reconstruction

In-house pavement maintenance is work that the Oregon City Public Works Department (OCPW) performs using City equipment. In the summer months, staffing is augmented by seasonal workers. Work can be anything from pothole repair or spot repair of small pavement failures to a larger scale version of pavement failure using the same in-house resources. The in-house street maintenance work is one of many work tasks performed by Street Division staff.

Crack Seal - Injection of hot tar or asphalt into cracks and paving seams.
Slurry Seal - Very thin layer of liquid asphalt and sand used to seal street surfaces. (Cost is typically less than $2 per square yard).
Chip Seal - A thin layer of hot asphalt is applied to the street surface then small gravel is applied and leveled and compacted into place. (Costs range from $2.50 to $3.00 per square yard.)
Overlay - A new layer of asphalt or concrete, which adds structural strength and seals the surface. Often grinding or inlays are needed to match pavement grades or remove severely distressed pavement. (Costs range from $6 to $26 per square yard, depending on the overlay thickness and preparation).
Reconstruction - The most expensive street treatment, reconstruction entails extensive street repair work that involves excavating the existing street and rebuilding gravel road base and surface layers. (Costs range from $35 to $55 per square yard depending on the pavement section and preparation).

All in-house pavement maintenance projects focused on repairing the base of the road, adding additional strength and repairing failing pavement sections. During the summer of 2009, OCPW used a local vendor for hot mix asphalt to complete a total of 8 larger scale individual projects applying a total of over 867 tons of asphalt. Table 3 includes a summary of the 2009 in-house pavement repairs.

Table 3 – 2009 In-House Work

Street	Beginning	Ending	Material Cost	In-House Labor Cost*	Project Cost	General Treatment Description
Leland Road - North bound travel lane	North of Clairmont Way	South of Warner Milne Road	$20,064	$35,840	$55,904	Spot repair, zipping and paving
15th Street	East of John Adams Street	West of Jackson Street	$12,597	$13,440	$26,037	Spot repair, zipping and paving
Park Drive	Linn Avenue	East of McCarver Avenue	$6,441	$17,920	$24,361	Spot repair, overlay
Main St. Extension	Main Street Extension	Firestone alley	$3,591	$8,960	$12,551	Spot repair, zipping and paving
Pioneer Center Parking Lot	All		$1,995	$4,480	$6,475	Spot repair, zipping and paving
5th Street	Monroe Street	Washington Street	$3,066	$8,960	$12,026	Spot repair, zipping and paving
Mt. View Cemetery	All		$3,066	$2,240	$5,306	Spot repair, zipping and paving
Barker Road	Near South End Road	Near South End Road	$1,425	$2,240	$3,665	Spot repair, zipping and paving

* In-house labor costs are shown for comparative presentation but they are not paid using PMUF funding but instead paid using State gas tax revenues.

Contract Street Reconstruction

Contract street reconstruction is other street reconstruction work that is completed through prevailing wage public improvement contracting. Typically, this work includes asphalt overlays, cold plane pavement removal (milling) combined with an asphalt overlay, structural dig-outs and repairs, or a complete reconstruction of the entire street section. Costs for this kind of work vary widely based on the type of repairs, classification of the street, volume of traffic, anticipated vehicle loading, and complexity of temporary traffic control. Generally these kinds of projects include engineering, project administration, detailed plans, and contract specifications.

In 2009 the City advertised the 2009 Pavement Rehabilitation Project and received five bids. The engineer's estimate for the project was $536,939 and the low bid came in at $382,741. The successful low bidder was awarded the project and completed the work with a final project cost including change orders at $410,227. The work performed is outlined in Table 4. The project plan set cover sheet and the bid tabulation sheet is included as Exhibit E & F.

Table 4 – 2009 Contracted Street Reconstruction

Street	Beginning	Ending	Length (ft)	Width (ft)	Area (sy)	Estimated Treatment Unit Cost ($/sy)*	Estimated Project Allocation**	General Treatment Description
15th St	Washington St	East of John Adams	300	40	1,333	$21.54	$28,713	2" mill and 3" paveback; curb to curb, coordinate with utilities
15th St	Jackson St. intersection	100' each way	275	34	1,039	$54.62	$56,750	2" mill and 3" paveback; curb to curb
3rd Ave	Ganong	Hedges	240	22	587	$9.85	$5,782	2" overlay
Center St	Sunset	S 1st St	1,700	24	4,533	$12.73	$57,705	3" overlay
Division St	Hospital reconstruction	Anchor Way	1,000	26	2,889	$23.50	$67,892	3" mill, 3" paveback
Hedges St	3rd St	McLoughlin Blvd	240	24	640	$15.22	$9,734	2" overlay
Molalla Ave	Beavercreek Rd	19349 Molalla Ave (Post Office)	3,000	7	2,333	$22.60	$52,726	Spot patching, 3" mill, 3" paveback
Warner Parrott Rd	Linn Ave	School crosswalk	675	varies	3,511	$37.29	$130,925	2" mill and 3" paveback, curb to curb, loops
Total							$410,227	

* The Estimated Unit Treatment Cost = the Estimated Project Allocation / Area

** The Estimated Project Allocation is not a detailed bid breakout of each unit quantity and unit price but rather it's an allocation based on an estimate of the percent of the overall project cost minus the cost of underground utilities or sidewalk improvements (non PMUF related work).

Another project completed through a City/developer agreement with the City paying for its portion of the work was:

Street	Beginning	Ending	Length (ft)	Width (ft)	Area (sy)	Treatment Unit Cost ($/sy)	Project Allocation	General Treatment Description
South End Road	Pinewood	1160 South End	1,900	40	8,444	$16.21	$136,897	2" mill and 3" paveback, curb to curb

A PMUF map showing the 2009 Street Repair Projects is attached as Exhibit B.

Future PMUF Work

The City has executed a personal services agreement with Harper Houf Peterson Righellis Inc., an engineering consultant, to develop the plans and specification necessary to solicit bids for the City's 2010 Oregon City Roadway Reconstruction Projects. Engineering consulting services for development of a bid package for the contract overlay work are anticipated to be $56,000. Table 5 includes a tentative description or the project limits, estimated quantities, a short description of the anticipated work and project cost estimates.

Table 5 - 2010 Street Work

Street	Beginning	Ending	Length (ft)	Width (ft)	Area (sy)	Treatment Unit Cost ($/sy)	Concept Estimate Project Cost*	General Treatment Description
Leland Road	Warner Milne Road	Clairmont Way	3000	30	10000	$30	$300,000	3" overlay; coordinate with utilities
Meyers Road	Clairmont Way	Frontier Parkway	1850	28	5760	$26	$150,000	3" overlay
Blue Ridge Drive	Shenandoah Drive	Shenandoah Drive	1400	32	5000	$17	$85,000	2" overlay
Warner Parrott Road	100' east of South End Road	650' west of Linn Avenue	3950	20	8777	$2.90	$30,450	Chip seal
Linn Avenue	50 feet north of Warner Parrott Road	Holmes Lane	1900	20	4222	$2.90	$14,750	Chip seal
Molalla Avenue	Dewey Street	Mountainview Street	1550	20	3444	$2.90	$12,000	Chip seal
Total							**$592,200**	

*Includes 10% contingency.

In addition to roadway reconstruction projects, the City intends to allocate $90,000 towards slurry seal (including crack sealing where needed) projects during the summer of 2010.

The proposed 2010 Street Repair project map is attached as Exhibit C.

Division Street

The Division Street reconstruction project between Molalla Avenue and 15th Street continues to be a priority for the Street Division. Past inquiries into the best solution(s) for Division Street have forced staff to step back and take a more

comprehensive look at Division Street. It's our intent to work with an engineering consultant to develop a comprehensive solution that looks at the underground utility and road section needs to accommodate TriMet bus traffic, sidewalk improvements and ADA measures. At this time, we anticipate a phased approach to Division Street with consideration for the cost of the project, available funding and the upcoming intersection improvements at Molalla Avenue/Taylor Street/7th Street/Division Street.

StreetSaver Pavement Management System

March and April 2010 included inspections and a new StreetSaver analysis of the City's pavement system. During 2010, The City will be using the new inspections and PCI calculations to develop scenarios, considering different annual funding contributions, to establish the City's 5-year paving CIP program. The StreetSaver results will be compared with the 2010 Water Master Plan to build a comprehensive list of paving projects that coordinate water and other utility improvement projects. A more reliable 5-year look ahead at how best to complete the City's pavement improvement projects is expected for the 2010 Pavement Maintenance Utility Fee Report.

Conclusion

The summer of 2009 was a productive and successful continuation of the City's pavement management program. This is a new program which we are committed to working into our already heavy workload. We know this program is important and valuable to the community. We continue to improve our in-house paving program and balance the demands on the department with the demands of the paving season. Our small paving crew and lightweight equipment continue to provide strong support for the more robust abilities of construction companies in the business of milling and paving.

Preventive maintenance continues to be a top priority for the City's 10 to 15 year-old residential streets, in some cases, even older streets. This is consistent both with the direction we received from the Transportation Funding Study Citizen Committee and with the way other agencies with proven preventive pavement maintenance programs proceed.

Thus far, all pavement maintenance expenses have stayed within the City's PMUF budget allocation. Highly competitive bids have been the new standard seen by local agencies which means City staff continues to be more confident that the PMUF will improve the City's overall PCI once fully funded and implemented.

Attachments:

Exhibit A, PMUF Major Accomplishments (2008-2009) Map
Exhibit B, 2009 Street Repair Projects
Exhibit C, Proposed 2010 Street Repair Projects
Exhibit D, In-House pavement Repair Stopgap Measures
Exhibit E, Project Cover Sheet – 2009 Pavement Rehabilitation
Exhibit F, Bid Tabulation Sheet – 2009 Pavement Rehabilitation Project

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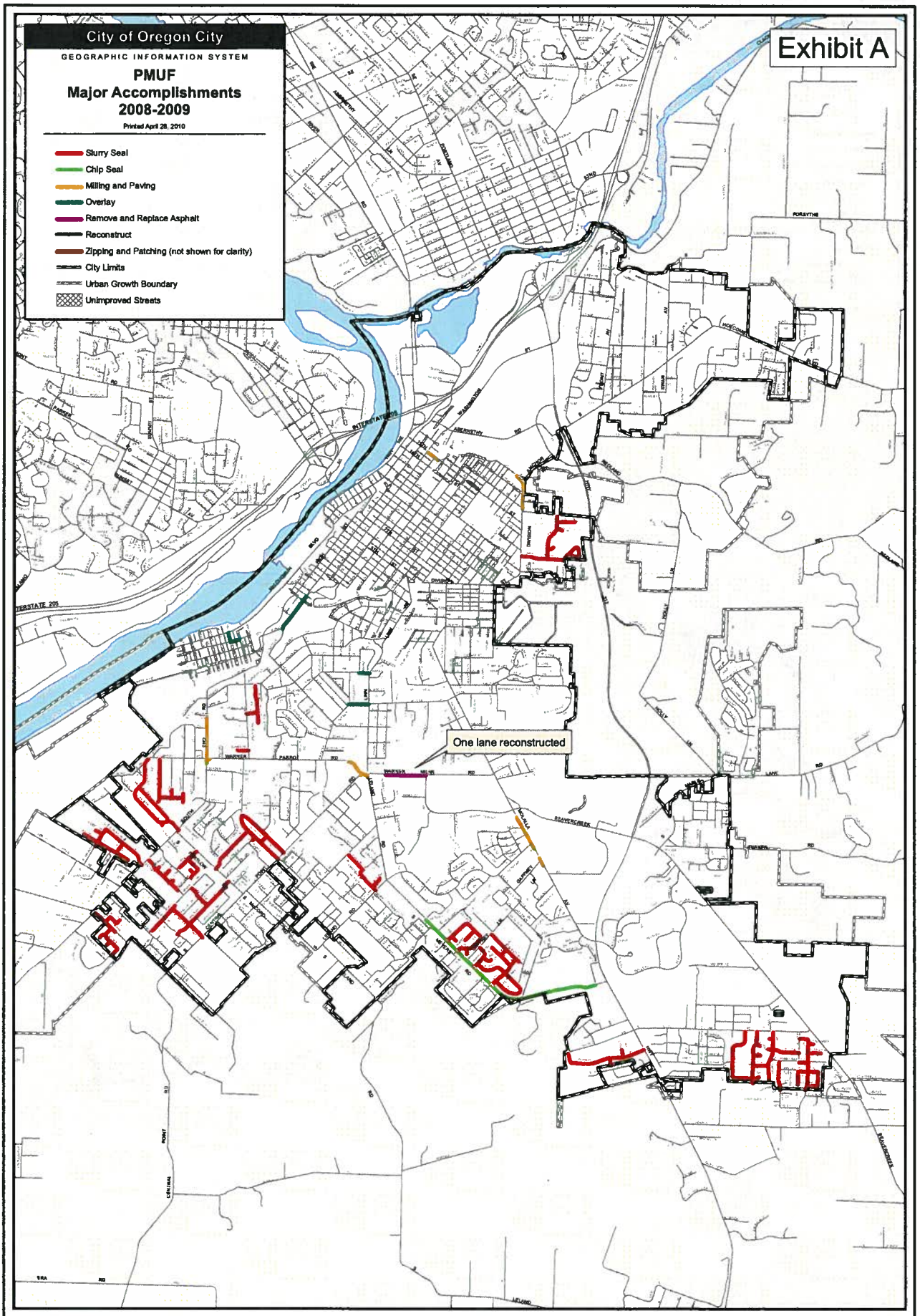
Appendix A

Preventive Pavement Maintenance Areas (2009)

Type II Slurry Seal @ $1.02/sq. yd.

Street	Beginning	Ending	Length (ft)	Total Area (sf)	Total Area (sy)	Total Cost
Highland Drive	Boynton Street	Central Point Road	1,629	47,241	5,249	$5,353.98
Boynton Street	Highland Drive	Central Point Road	1,683	55,539	6,171	$6,294.42
Tower Hill Drive	Boynton Street	Highland Drive	255	7,395	822	$838.44
Clearbrook Drive	Barker Avenue	End	1,085	34,310	3,812	$3,888.24
Pin Oak Drive	Woodlawn Avenue	Clearbrook Drive	280	8,680	964	$983.28
Wake Robin Circle	Gilman Drive	End	1,145	30,425	3,381	$3,448.62
Cominger Drive	Pease Road	Lot Whitcomb Drive	589	24,834	2,759	$2,814.18
Cominger Court	Lot Whitcomb Drive	End	160	10,810	1,201	$1,225.02
Gilman Drive	Division Street	Wake Robin Circle	1,215	35,235	3,915	$3,993.30
Trillium Park Drive	Gilman Drive	Davis Road	1,321	33,025	3,669	$3,742.38
Shelby Rose Drive	South End Road	Maywood Street	1,472	54,488	6,054	$6,175.08
Bean Court	Trillium Park Drive	End	472	17,875	1,986	$2,025.72
Canyon Court	Trillium Park Drive	End	169	4,225	469	$478.38
Swordfern Court	Trillium Park Drive	End	135	9,175	1,019	$1,039.38
Merchant Place	North end of loop	Brandow Street	155	4,340	482	$491.64
Maywood Street	City limits	Shelby Rose Drive	589	17,081	1,898	$1,935.96
Maywood Court	Maywood Street	End	158	9,482	1,054	$1,075.08
Rusty Terrace	Brandow Street	Shelby Rose Drive	351	10,179	1,131	$1,153.62
Brandow Street	All		1,433	53,182	5,909	$6,027.18

Street	Beginning	Ending	Length (ft)	Total Area (sf)	Total Area (sy)	Total Cost
Lot Whitcomb Drive	Leland Road	Leland Road	651	20,181	2,242	$2,286.84
Cook Street	Lawton Road	End of old pavement near Oaktree Avenue	1,228	39,368	4,374	$4,461.48
Julie Ann Drive	Cook Street	Josephine Street	689	19,981	2,220	$2,264.40
Sunny Lane	Julie Ann Drive	Where road widens into a circle	223	6,467	719	$733.38
Josephine Street	One lot north of Julie Ann Drive	End	246	6,888	765	$780.30
Auburn Drive	Boynton Street	Start of new pavement	107	3,103	345	$351.90
Spring Valley Drive	Partlow Road	Boynton Street	1,461	42,369	4,708	$4,802.16
Parrish Road	South End Road	145 ft southeast of Pennys Way	780	22,620	2,513	$2,563.26
Linda Drive	Parrish Road	Karen Scott Drive	167	8,226	914	$932.28
Karen Scott Drive	Linda Drive	Todd Kelli Way	197	9,366	1,041	$1,061.82
Todd Kelli Way	Karen Scott Drive	Start of new pavement	97	2,716	302	$308.04
Pennys Way	Parrish Road	Finnegan's Way	740	25,020	2,780	$2,835.60
Finnegan's Way	Pennys Way	City Limits	220	6,160	684	$697.68
Kari Ann Court	Pennys Way	End	80	8,435	937	$955.74
Jennifer Lynn Court	Pennys Way	End	139	9,842	1,094	$1,115.88
Filbert Drive	South End Road	Pine Place	633	17,724	1,969	$2,008.38
Pine Place	Filbert Drive	Start of new pavement	246	7,134	793	$808.86
Elmar Drive	Woodlawn Avenue	End	258	10,240	1,138	$1,160.76
Totals			**22,458**		**81,483**	**$83,112.66**



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Please recycle with colored office grade paper.

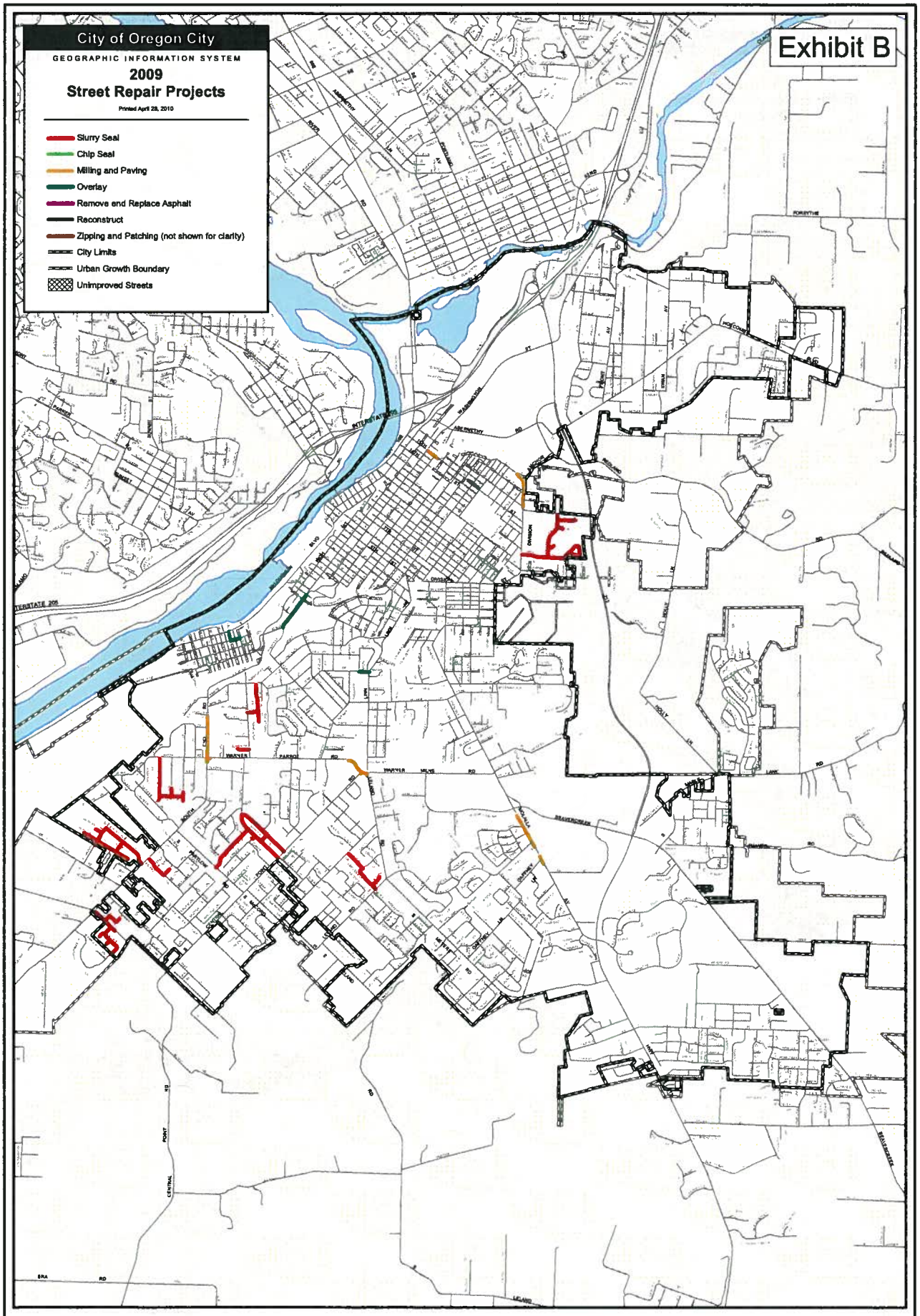
N W E S

0 0.25 0.5 1 1.5 Miles

0 1,000 2,000 4,000 6,000 8,000 Feet

City of Oregon City
P.O. Box 3040
625 Center St.
Oregon City, OR 97045
503-657-0891 phone
503-657-6629 fax
www.ci.oregon-city.or.us

OREGON CITY



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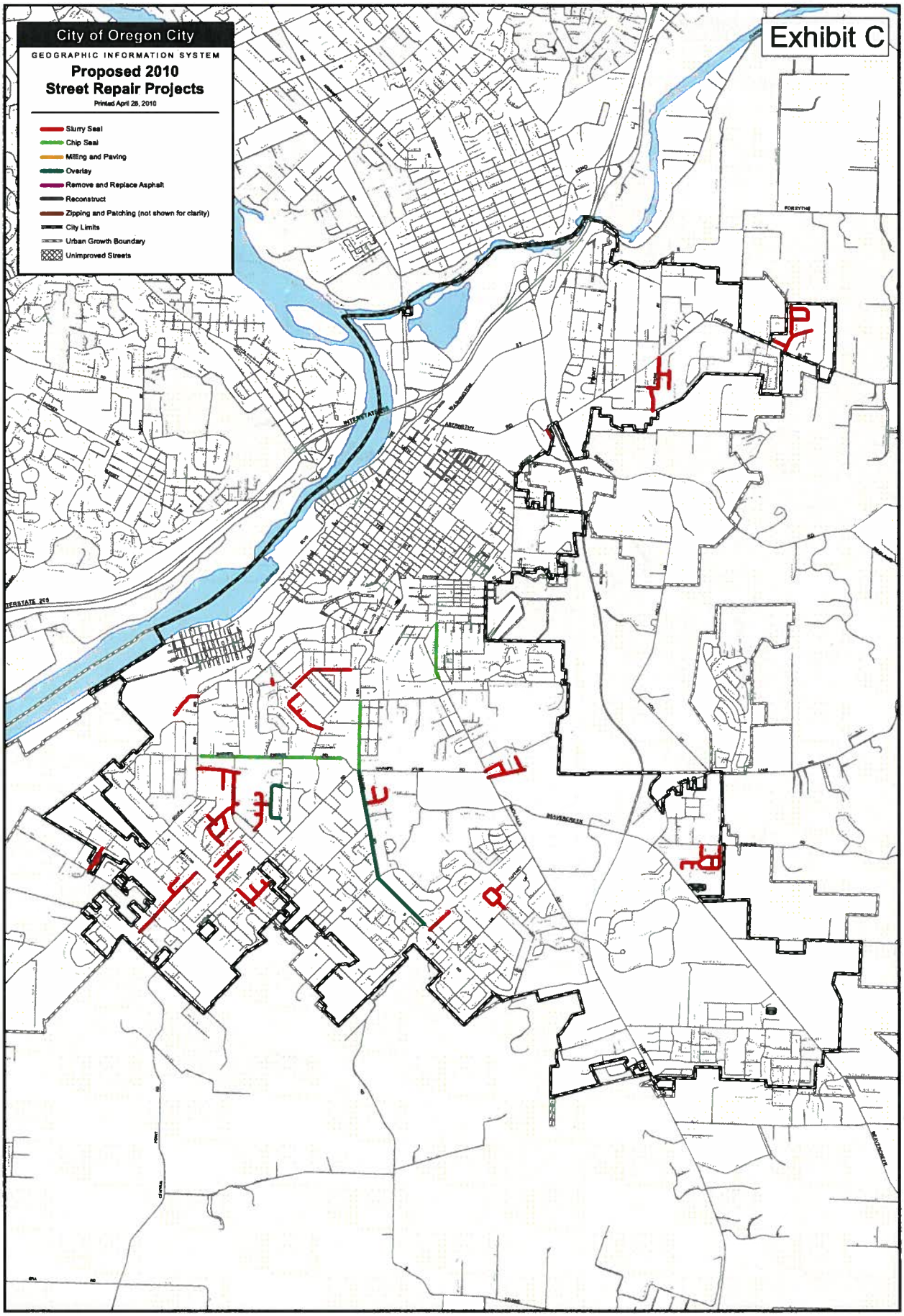
Plot date: April 28, 2010
Plot name: 2009 Street Repair Projects - 11x17P - 20100428.pdf
Map name: 2009 Street Repair Projects - 11x17P.mxd



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N W E S

0 0.25 0.5 1 Miles

0 1,000 2,000 4,000 6,000 Feet

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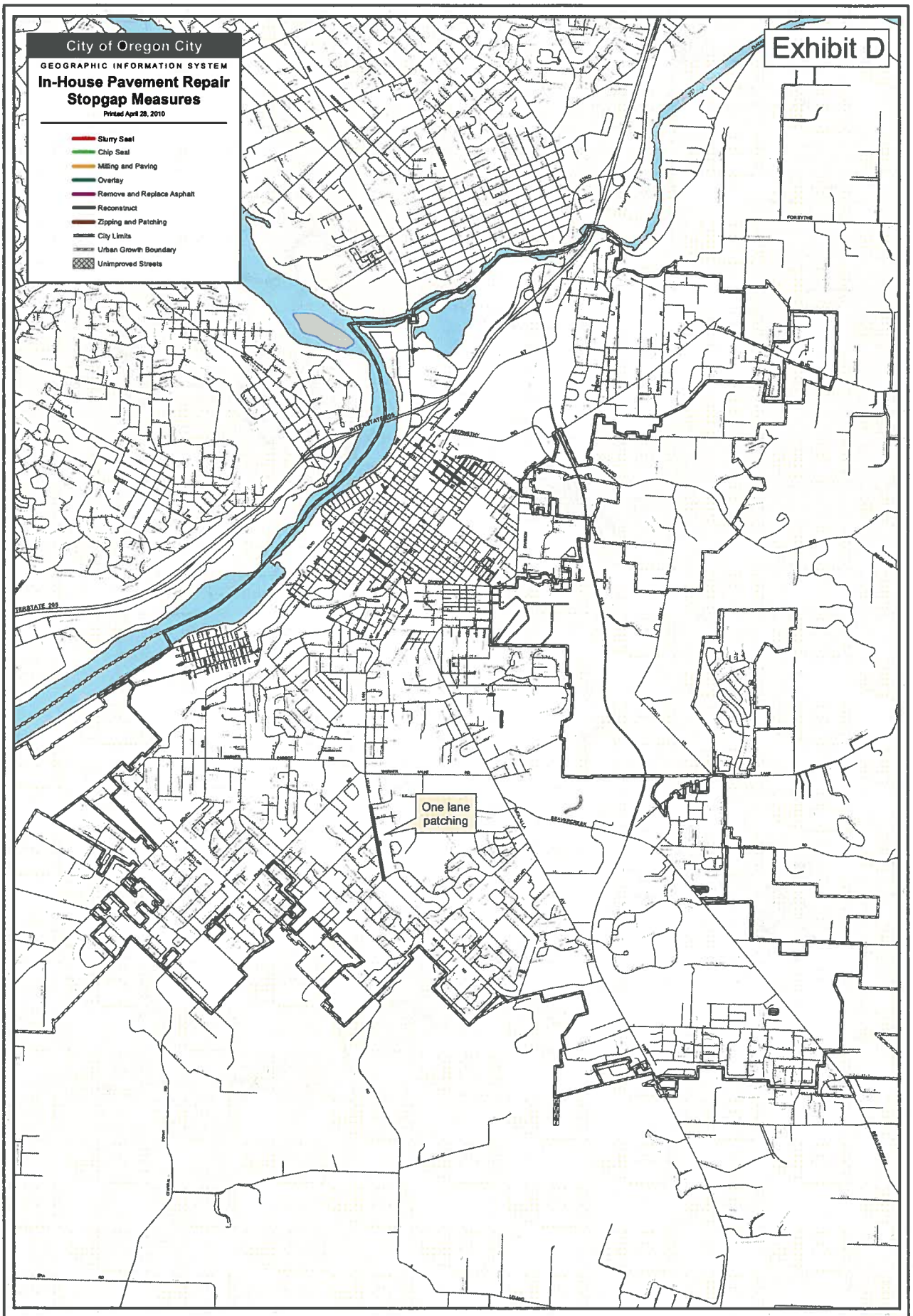

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N W E S

0 0.25 0.5 1 Miles

0 1,000 2,000 4,000 6,000 Feet

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Plot date: April 28, 2010
Plot name: PWUP - Stopgap Measures Map - 20100429 - 11x17P.pdf
Map name: PWUP - Stopgap Measures Map - 20100429 - 11x17P.mxd

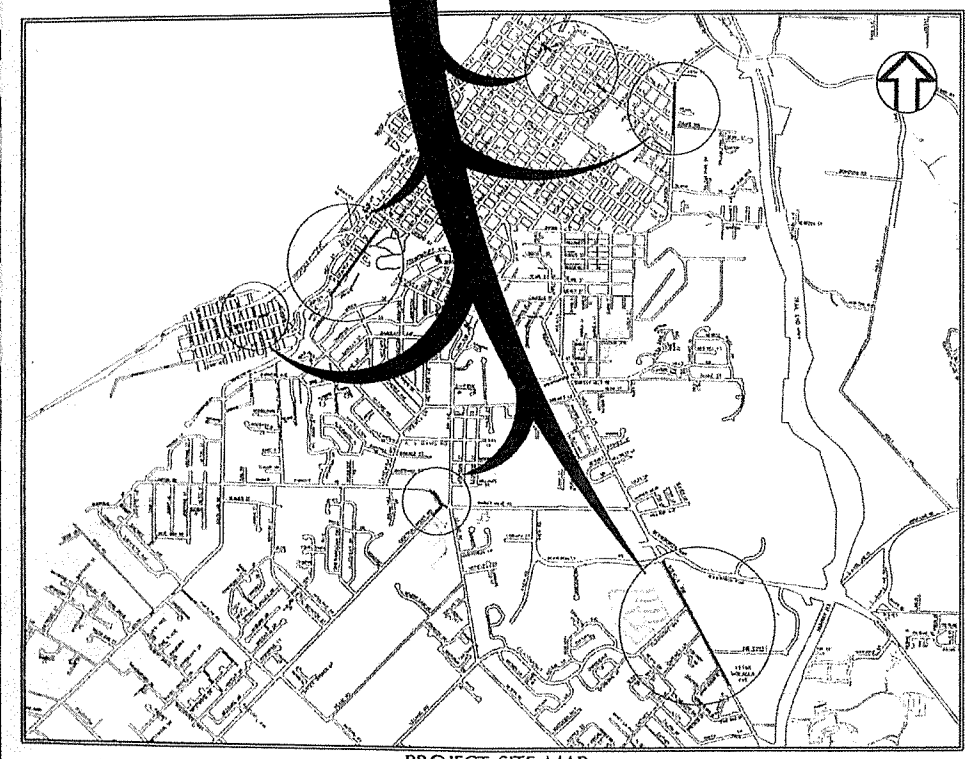
CITY OF OREGON CITY

2009 PAVEMENT REHABILITATION PROJECT

July 2009

SITE LOCATIONS

SEE DRAWING INDEX



PROJECT SITE MAP

NOT TO SCALE

NOTE:
1. INFORMATION SHOWN IS BASED ON THE CITY'S AVAILABLE GIS DATA BASE. CONTRACTOR SHALL VISIT SITE AND VERIFY ALL EXISTING CONDITIONS PRIOR TO BEGINNING CONSTRUCTION. SEE GENERAL NOTES, SHEET C2 FOR ADDITIONAL REQUIREMENTS.

OC PROJECT NO. CI 07-005

PART V - CONTRACT DRAWINGS

wallis

Civil Engineer: Wallis Engineering
215 W. 4th Ave., Suite 200
Vancouver, Washington 98660
(360) 695-7041
Contact: Brady Richins, P.E

Owner: City of Oregon City
P.O.Box 3040
320 Warner Milne Road
Oregon City, Oregon 97045
Oregon City Public Works Department
Contact: John Lewis, Project Manager
(503) 657-6241

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C4	3RD AVENUE
C5	HEDGES STREET
C6	MOLALLA AVE
C7	MOLALLA AVE II
C8	MOLALLA AVE III
C9	CENTER STREET
C10	CENTER STREET II
C11	WARNER PARROTT ROAD
C12	DIVISION STREET
C13	DIVISION STREET II
C14	STANDARD DETAILS
C15	STANDARD DETAILS II

EXISTING

- EXISTING PROPERTY LINE
- EXISTING EDGE OF PAVEMENT
- EXISTING CURB
- EXISTING CONCRETE SIDEWALK
- EXISTING STORM SEWER
- EXISTING SANITARY SEWER
- EXISTING WATER
- EXISTING GAS
- EXISTING BUILDING
- EXISTING GUARDRAIL
- EXISTING DRAINAGE WAY
- EXISTING MANHOLE
- EXISTING CATCH BASIN
- EXISTING CURB INLET
- EXISTING WATER METER
- EXISTING WATER VALVE
- EXISTING FIRE HYDRANT
- EXISTING UTILITY POLE
- EXISTING SIGN
- EXISTING MAILBOX
- EXISTING LOOP DETECTOR

PROPOSED

- PROPOSED SIDEWALK
- PROPOSED ROADWAY RECONSTRUCTION
- PROPOSED ROADWAY OVERLAY
- PROPOSED ROADWAY INLAY
- PROPOSED CURB
- PROPOSED STORM SEWER
- PROPOSED SAWCUT
- PROPOSED CATCH BASIN

Bid Tabulation
2009 Pavement Rehabilitation Project
City of Oregon City, OR
Prepared by Wallis Engineering, JSI
Bid Opening: July 28, 2009 2:00 PM
WE#1264A
= Original Bid Error

DATE CREATED: 7/29/2009

				Brix Paving Co.		Portland Road		Eagle Eisner, Inc.		Parker NW Paving Co.		Knife River		Engineer's Estimate	
Item No	Item Description	Qty	Unit	Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost	Unit Cost	Total Cost
1.	Mobilization	1	LS	$9,398.15	$9,398.15	$14,250.00	$14,250.00	$0.00	$0.00	$24,600.00	$24,600.00	$30,100.00	$30,100.00	$35,126.91	35,126.91
2.	Temporary Work Zone Traffic Control, Complete	1	LS	$14,768.94	$14,768.94	$27,500.00	$27,500.00	$42,500.00	$42,500.00	$35,000.00	$35,000.00	$36,000.00	$36,000.00	$60,000.00	60,000.00
3.	Erosion Control	1	LS	$559.75	$559.75	$1,000.00	$1,000.00	$300.00	$300.00	$3,000.00	$3,000.00	$1,300.00	$1,300.00	$1,500.00	1,500.00
4.	Pollution Control Plan	1	LS	$111.95	$111.95	$1,000.00	$1,000.00	$200.00	$200.00	$500.00	$500.00	$1,000.00	$1,000.00	$500.00	500.00
5.	Removal of Inlets	4	EA	$279.88	$1,119.52	$200.00	$800.00	$1,400.00	$5,600.00	$200.00	$800.00	$260.00	$1,040.00	$500.00	2,000.00
6.	General Excavation	260	CY	$38.06	$9,895.60	$39.50	$10,270.00	$22.00	$5,720.00	$31.00	$8,060.00	$35.00	$9,100.00	$20.00	5,200.00
7.	12-Inch Subgrade Stabilization	100	SY	$14.55	$1,455.00	$31.00	$3,100.00	$20.00	$2,000.00	$20.00	$2,000.00	$26.00	$2,600.00	$35.00	3,500.00
8.	Trench Foundation	5	CY	$33.59	$167.95	$70.00	$350.00	$90.00	$450.00	$35.00	$175.00	$53.00	$265.00	$100.00	500.00
9.	12-Inch Storm Sewer Pipe	135	LF	$80.60	$10,881.00	$15.00	$2,025.00	$69.00	$9,315.00	$37.00	$4,995.00	$55.00	$7,425.00	$60.00	8,100.00
10.	Concrete Inlets, Type G-2 Catch Basin with Sump	4	EA	$1,339.73	$5,358.92	$1,375.00	$5,500.00	$1,307.00	$5,228.00	$1,500.00	$6,000.00	$1,050.00	$4,200.00	$1,500.00	6,000.00
11.	Adjust Existing Structure to Grade	57	EA	$127.27	$7,254.39	$125.00	$7,125.00	$179.00	$10,203.00	$250.00	$14,250.00	$100.00	$5,700.00	$350.00	19,950.00
12.	Connection to Existing Structures	2	EA	$391.83	$783.66	$440.00	$880.00	$416.00	$832.00	$500.00	$1,000.00	$265.00	$530.00	$1,000.00	2,000.00
13.	Temporary Asphalt Trench Resurfacing	263	SF	$3.32	$873.16	$3.00	$789.00	$2.50	$657.50	$3.50	$920.50	$2.10	$552.30	$3.00	789.00
14.	Cold Plane Pavement Removal, 0-2 Inch Depth	5950	SY	$5.84	$34,748.00	$7.00	$41,650.00	$6.00	$35,700.00	$5.70	$33,915.00	$5.75	$34,212.50	$11.25	66,937.50
15.	Cold Plane Pavement Removal, 2-3 Inch Depth	1245	SY	$11.81	$14,703.45	$7.00	$8,715.00	$7.70	$9,586.50	$5.70	$7,096.50	$6.00	$7,470.00	$13.50	16,807.50
16.	3/4 Inch - 0 Aggregate Base	71	CY	$39.18	$2,781.78	$60.00	$4,260.00	$59.00	$4,189.00	$60.00	$4,260.00	$43.00	$3,053.00	$40.00	2,840.00
17.	1-1/2 Inch - 0 Aggregate Base	128	CY	$34.70	$4,441.60	$60.00	$7,680.00	$57.00	$7,296.00	$50.00	$6,400.00	$43.00	$5,504.00	$35.00	4,480.00
18.	Level 2, 1/2-Inch Dense HMAC, PG 64-22	1158	TON	$74.78	$86,595.24	$74.00	$85,692.00	$72.00	$83,376.00	$68.00	$78,744.00	$75.00	$86,850.00	$85.00	98,430.00
19.	Level 3, 1/2-Inch Dense HMAC, PG 70-22	1787	TON	$75.08	$134,167.96	$71.00	$126,877.00	$72.00	$128,664.00	$75.00	$134,025.00	$71.00	$126,877.00	$90.00	160,830.00
20.	Asphalt Ditch Lining	905	LF	$5.98	$5,411.90	$8.00	$7,240.00	$4.00	$3,620.00	$7.00	$6,335.00	$5.50	$4,977.50	$3.00	2,715.00
21.	Concrete Curbs, Standard	143	LF	$17.32	$2,476.76	$13.40	$1,916.20	$26.00	$3,718.00	$30.00	$4,290.00	$33.00	$4,719.00	$18.00	2,574.00
22.	Concrete Walks	382	SF	$16.28	$6,218.96	$15.60	$5,959.20	$10.00	$3,820.00	$11.25	$4,297.50	$9.00	$3,438.00	$5.00	1,910.00
23.	Permanent Striping, Complete	1	LS	$17,128.36	$17,128.36	$14,000.00	$14,000.00	$18,085.00	$18,085.00	$19,000.00	$19,000.00	$17,000.00	$17,000.00	$12,000.00	12,000.00
24.	Remove and Reinstall Existing Signs	1	LS	$223.90	$223.90	$450.00	$450.00	$800.00	$800.00	$175.00	$175.00	$515.00	$515.00	$500.00	500.00
25.	Traffic Signal Loop Detector Modifications	21	EA	$526.17	$11,049.57	$500.00	$10,500.00	$500.00	$10,500.00	$500.00	$10,500.00	$445.00	$9,345.00	$1,000.00	21,000.00
26.	CBU Mailbox Relocation	1	EA	$167.93	$167.93	$500.00	$500.00	$200.00	$200.00	$750.00	$750.00	$105.00	$105.00	$750.00	750.00
	Total				382,741.40		390,028.40		390,540.00		411,088.50		403,876.30		$36,939.91

Note: Unit Price for Mobilization bid item was not entered

Pavement Management Program Budget Options Report

Capitol Asset & Pavement Services Inc

City of Oregon City
Public Works

April, 2010

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Sections Selected for Treatment – Current Budget Scenario

EXECUTIVE SUMMARY

Capitol Asset & Pavement Services, Inc. was contracted by the City of Oregon City to determine the impact of funding levels on the network pavement condition. The Metropolitan Transportation Commission, MTC, Streetsaver 9.0 Pavement Management Program (PMP) was used for this evaluation. This system strives to develop a maintenance strategy that first, will improve the overall condition of the street network to an optimal Pavement Condition Index, PCI, in the low to mid 80's and second, maintain it at that level.

A detailed visual inspection of the City of Oregon City streets resulted in a calculated average PCI of 62. Using a 0-100 PCI scale, with 100 being the most favorable, a rating of 62 places the City's street network in the middle range of the 'Satisfactory' condition category. In order to determine GASB 34 Statement asset valuation and funding levels to maintain current infrastructure, the City's street network replacement value is estimated at $108.9 million. Using this estimate and the MTC program projections, an unrestricted funding level of $34.7 million over the next five-year period is needed to achieve a PCI in the low to mid 80's (Scenario 1). Of this total, approximately $17.2 million is needed in the first year alone, primarily to repair streets in the 'fair' to 'poor' range, those streets with a PCI of 0-49, which is about 32.0 percent of Oregon City's total network. The total budget needs amount of $34.7 million exceeds Oregon City's current funding level by $27.2 million, thus creating a backlog in deferred maintenance.

Oregon City implemented a street utility fee, which has steadily increased their funding level for maintaining streets over the last two years, and will increase it further in the near future. The estimated funding level for the next five years is $7.527 million (Scenario 2). According to the Streetsaver Scenarios analysis module, this funding level should increase the network PCI by 3 points, from the current level of 62 to 65 by 2014. The deferred maintenance backlog increases over the course of the five year analysis period, to nearly $28.0 million by 2014. Had the City not implemented the increased funding for street maintenance, and a funding level of $500,000 per year was continued over the next five years, the street network PCI would decrease by 4 points, to 58 in 2014 (Scenario 3).

Additionally, if the City of Oregon City were to increase their current funding to an investment level totaling $11.0 million over a five (5) year period, the PCI would increase by five points, to 67 in 2014 (Scenario 4). Under this funding level, the deferred maintenance backlog still increases to $26.2 million at the end of five years. In order to increase the network PCI by ten (10) points over the next five years, an annual budget of $3.6 million would be required (Scenario 5). This would also result in a lower deferred maintenance backlog of $19.1 million in 2014.

Although the overall network Pavement Condition Index currently is 62, the PCI is not the only critical indicator of the overall health of the paved street network. Based on the current funding levels the deferred maintenance backlog will continue to increase, which will place additional financial burden and funding requirements to maintain the street system in future years. A surface management plan should be developed that will address the projected deferred maintenance back-log to avoid future exponential cost in providing an acceptable service level of the City's paved street system.

Purpose

This report is intended to assist the City of Oregon City with identifying street maintenance priorities specific to the City.[1] The City's street network and GASB 34 Statement replacement value is estimated at $108.9 million and represents a significant asset for City officials to manage. This asset valuation is assessed by the assumption of replacing the entire street network at today's dollars. The estimated replacement value is an average cost, which was arrived by surveying local agencies for their unit cost experience for pavement preservation and rehabilitation programs.[2] The report examines the overall condition of the street network and highlights the impacts of funding levels on the network pavement condition and deferred maintenance funding shortfalls. Conducting 'what-if' analyses using the City of Oregon City pavement management system database were examined over five-year periods.

Definitions

The *pavement condition index*, or PCI, is a measurement of the health of the pavement network or condition and ranges from 0 to 100. A newly constructed street would have a PCI of 100, while a failed street would have a PCI of 10 or less. The PCI is calculated based on pavement distresses identified in the field.

Network is defined as a complete inventory of all streets and other pavement facilities in which the City has jurisdiction and maintenance responsibilities. To facilitate the management of streets, they are subdivided into management sections identified as a segment of street, which has the same characteristics.

Urban Arterial street system carries the major portion of trips entering and leaving the urban area, as well as the majority of through movements desiring to bypass the central City. In addition, significant intra-area-travel such as between central business districts and outlying residential areas exists.

Urban Collector Street provides land access service and traffic circulation within residential neighborhoods, commercial, and industrial areas. It differs from the arterial system in that facilities on a collector system may penetrate residential neighborhoods.

Urban Local Street system comprises all facilities not one of the higher systems. It serves primarily to provide direct access to abutting land and access to the higher systems.

Preventive Maintenance refers to repairs applied while the pavement is in "good" condition. Such repairs extend the life of the pavement at relatively low costs, and prevent the pavement from deteriorating into conditions requiring more expensive treatments. Preventive maintenance treatments include slurry sealing, crack sealing, and deep patching. Treatments of this sort are applied before pavement deterioration has become severe and usually cost less than $2.00/sq. yd.

Deferred Maintenance refers to the dollar amount of maintenance and rehabilitation work that should have been completed to maintain the street in "good" condition, but had to be deferred

[1] Private streets (those **not** owned by the City) are excluded from analysis and not accounted for in this report.

[2] Replacement cost includes only the paved roadway (consisting of all labor and materials associated with construction) from curb to curb.

due to funding deficiencies for preventative maintenance and/or pavement rehabilitation programs. The actual repairs that are being deferred are often referred to as "backlog."

Stop Gap refers to the dollar amount of repairs applied to maintain the pavement in a serviceable condition (e.g. pothole patching). These repairs are a temporary measure to stop resident complaints, and do not extend the pavement life. Stopgap repairs are directly proportional to the amount of deferred maintenance. Money spent on stopgap repairs are often taken from preventive maintenance budgets.

Existing Pavement Condition

The City of Oregon City is responsible for the repair and maintenance of 36.82 lane miles of Arterial, 29.64 lane miles of Collector, and 184.30 lane miles of Residential for a total of 250.76 lane miles of asphalt concrete and Portland cement concrete pavements or a total of 123.62 centerline miles of streets. Figure 1 displays the average PCI by functional classification. To assist with the overall management of the street network, the City's Street Systems have been subdivided into 1045 individual units identified as management sections.

The current overall network average PCI for the City of Oregon City is 62, placing the network in the middle-range of the 'Satisfactory' condition category. Table 1 summarizes by functional classification the condition of the street network in the City of Oregon City.

Figure 1. Weighted Average PCI by Functional Classification

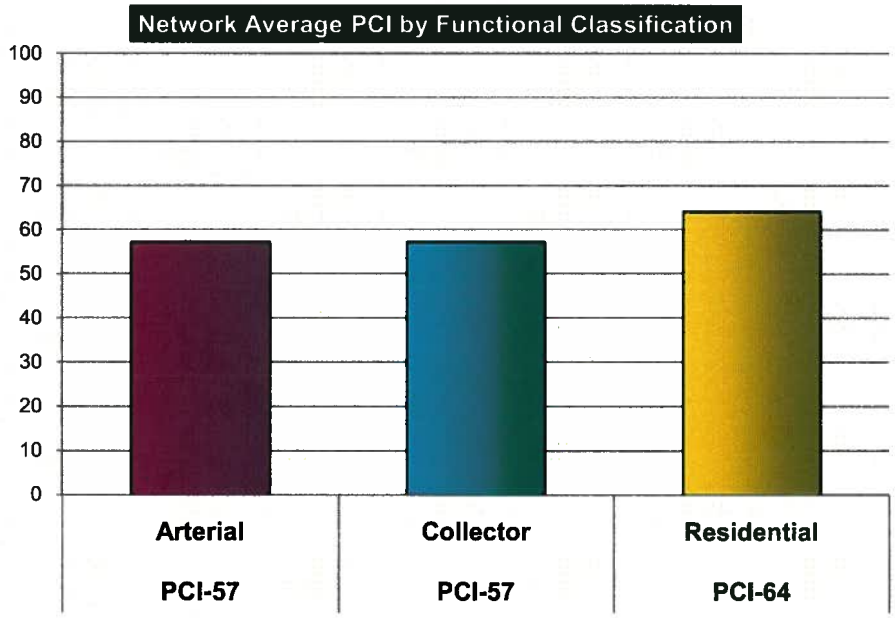
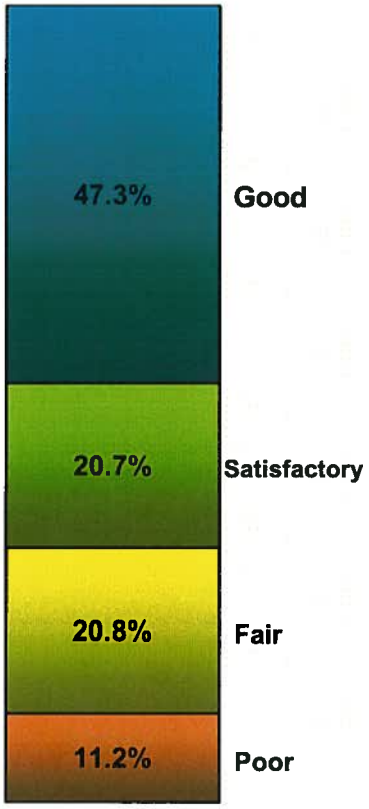


Table 1. Pavement Condition Summary for City of Oregon City

Condition Category	PCI Range	Network %
Good	70 - 100	47.3%
Satisfactory	50 - 69	20.7%
Fair	25 - 49	20.8%
Poor	0 - 24	11.2%
2010 – Average Network PCI = 62		



Present Cost to Repair the Street Network

The MTC Streetsaver Pavement Management Program is designed to achieve an optimal network PCI somewhere between the low and mid 80's, which is in the middle of the good condition category. In other words, the system will recommend maintenance treatments in an attempt to bring all of the streets in the City of Oregon City to a 'good' condition, with the majority of the streets falling in the low to mid 80's PCI range. Streets with a PCI in the 80's (as opposed to 70's) will likely remain in the 'good' condition category for a longer period of time in this range where relatively inexpensive preventive maintenance treatments will be the main strategy to keep these streets in that category. Once the PCI falls below 70, more expensive rehabilitation treatments will be needed.

The Budget needs module of the PMP estimates a funding level of $34.7 million over the next five-year period for the City's pavement preservation and rehabilitation programs to improve and maintain the street network PCI in the low to mid 80's. Of this total, approximately $17.2 million is needed in the first year alone. These costs exceed the City of Oregon City's planned funding level by approximately $27.2 million.

As mentioned earlier, the average PCI for the City of Oregon City streets is 62, which is in the 'Satisfactory' condition category. Why then, does it cost so much to repair the Oregon City's streets, and why bother improving them?

First, how much it costs to repair and maintain a pavement depends on its current PCI. In the good category, it costs very little to apply preventive maintenance treatments such as crack and surface seals which can extend the life of a pavement by correcting minor faults and reducing further deterioration. Treatments of this sort are applied before pavement deterioration has become severe and usually cost less than $2.00/sq. yd. Almost half (47.3%) of the City of Oregon City's street network would benefit from these relatively inexpensive, life-extending treatments.

Approximately one-fifth (20.7%) of the City of Oregon City's street network falls into the 'Satisfactory' condition category. Pavements in this range show some form of distress caused by traffic load related activity or environmental distress that require more than a life-extending treatment. At this point, a well-designed pavement will have served at least 75 percent of its life with the quality of the pavement dropping approximately 40 percent. The street surface may require a slurry seal application or a thin overlay. These treatments typically range in cost from $2.00 to $9.00/sq. yd.

The remaining 32.0 percent of the City of Oregon City street network falls into the 'fair' or 'poor' PCI ranges. These pavements are near the end of their service lives and often exhibit major forms of distress such as potholes, extensive cracking, etc. At this stage, a street usually requires either a mill and thick overlay or reconstruction. The costs for these treatments range from $12.50 to $60.00/sq. yd. One of the key elements of a pavement repair strategy is to keep streets in the good or satisfactory categories from deteriorating. This is particularly true for streets in the satisfactory range, because they are at the point where pavement deterioration accelerates if left untreated. On the other hand, the deterioration rate for pavements in the 'fair' to 'poor' range is relatively flat; the condition of these streets will not decline significantly if repairs are delayed. As more 'good' streets deteriorate into the 'satisfactory' and 'poor' categories, the price tag of deferred maintenance will continue to increase. The price tag of deferred maintenance backlog will stop increasing only when enough funds are provided to prevent streets from deteriorating into a worse condition category, or the whole network falls into the 'poor' category (i.e. can not deteriorate any further).

Future Expenditures for Pavement Maintenance

Based on the street utility fee passed in 2007, we anticipate that the City of Oregon City will spend approximately $7.527 million on pavement maintenance during the next five years (FY 2010-11 through FY 2014-15).

Table 2. Projected Pavement Budget for FY 2010-11 to FY 2014-15

	2010-11	2011-12	2012-13	2013-14	2014-15	Total
Current Funding	$1,124,000	$1,348,000	$1,685,000	$1,685,000	$1,685,000	**$7,527,000**

Budget Needs

Based on the principle that it costs less to maintain streets in good condition than bad, the MTC PMP strives to develop a maintenance strategy that will first improve the overall condition of the network to an optimal PCI somewhere between the low and mid 80's, and then sustain it at that level. The average PCI for the City of Oregon City is currently 62, which is in the 'Satisfactory' condition category, and a significant area of the network suffers from load-related distresses. In addition, current funding strategies demonstrate there is a backlog in the first year of the scenario of $16.1 million in deferred maintenance. If these issues are not addressed, the quality of the street network will inevitably decline. In order to correct these deficiencies, a cost-effective funding and maintenance and rehabilitation strategy must be implemented.

The first step in developing a cost-effective maintenance and rehabilitation strategy is to determine, assuming unlimited revenues, the maintenance "needs" of the City of Oregon City street network. Using the PMP budget needs module; street maintenance needs are estimated at $34.7 million over the next five years. If the City follows the strategy recommended by the program, the average network PCI will increase to 84. If, however, current pavement maintenance funding is exhausted and little or no maintenance is applied over the next five years, already distressed streets will continue to deteriorate, and the network PCI will drop to 52. The results of the budget needs analysis are summarized in the table below.[3]

Table 3. Summary of Results from Needs Analysis

Fiscal Years	2010-11	2011-12	2012-13	2013-14	2014-15	Total
PCI with Treatment	80	80	81	84	84	---
PCI, no Treatment	62	59	57	55	52	---
Budget Needs	$17,210,681	$4,114,823	$4,715,921	$5,543,222	$3,118,809	**$34,703,456**
Preventative Maintenance	$406,428	$45,271	$84,524	$185,516	$51,473	**$773,212**
Rehabilitation	$16,804,252	$4,069,551	$4,631,395	$5,357,705	$3,067,335	**$33,930,238**
Deferred Maintenance	$0	$0	$0	$0	$0	$0

Table 3 shows the level of expenditure required to raise the City of Oregon City's pavement condition to an optimal network PCI of 84 and eliminate the current maintenance and rehabilitation backlog. The results of the budget needs analysis represent the ideal funding strategy recommended by the MTC PMP. Of the $34.7 million in maintenance and rehabilitation needs shown, approximately $773,000 or 2.2 percent is earmarked for preventive maintenance or life-extending treatments, while $33.9 million or 97.8 percent is allocated for the more costly rehabilitation and reconstruction treatments. The cost-effectiveness of preventive maintenance treatments is demonstrated in Figure 2, which compares the current condition of the network, and the maintenance needs estimated by the program. The portion of the network in good condition, 47.3 percent, requires approximately $773,000 of work over the next five years, whereas the 32.0 percent in fair to poor condition needs $32.6 million in expenditures

[3] Actual program outputs are shown in Appendixes A through D

Figure 2. Cost-Effectiveness of Treatments

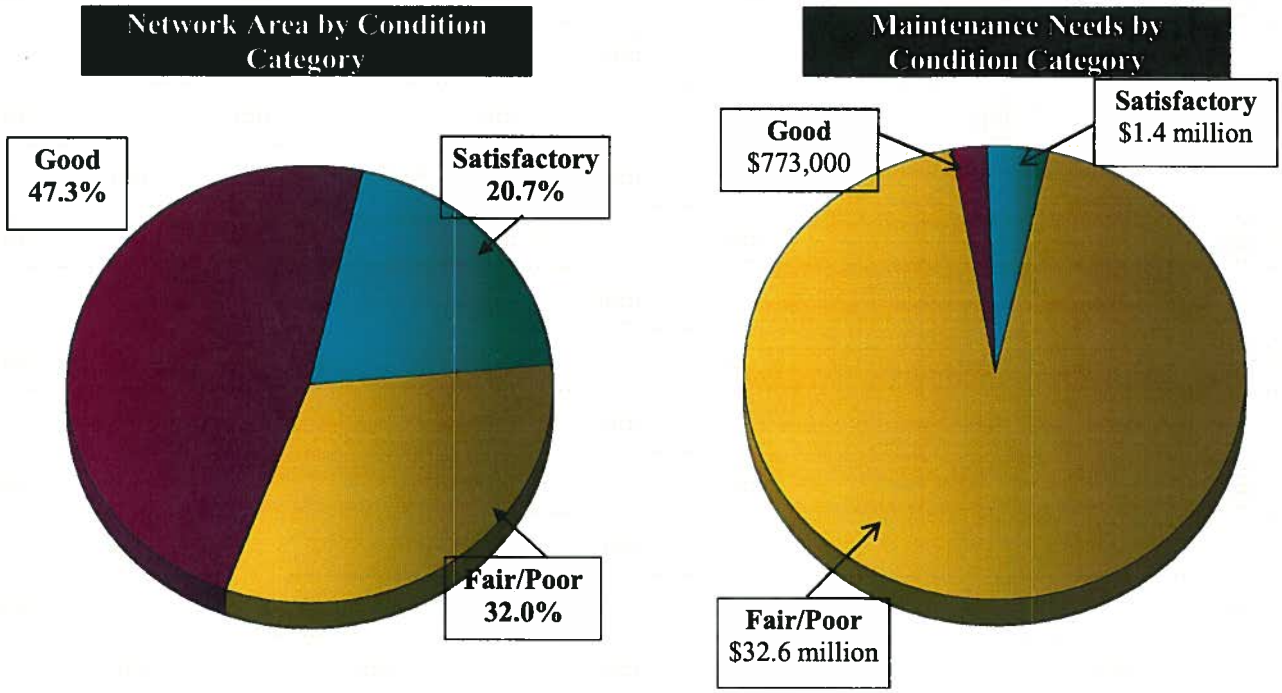
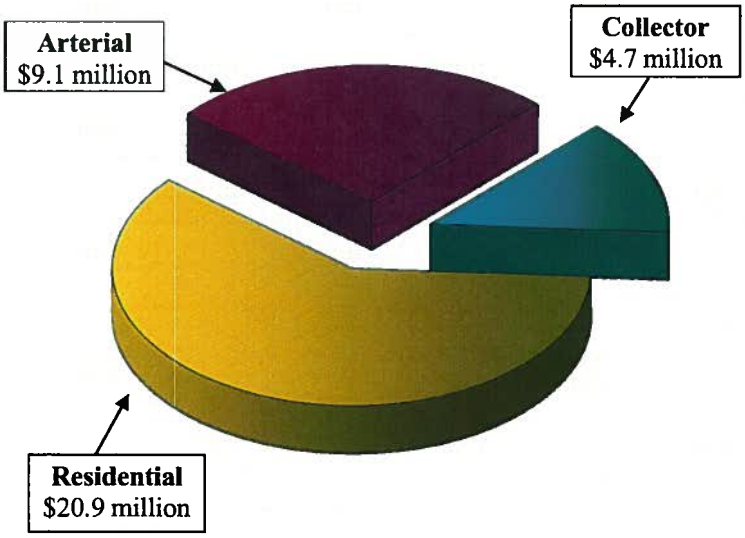


Figure 3 is based on the Budget Needs Predictive Module. The Pavement Management Program is recommending a funding level of $34.7 million over a five-year period. Figure 3 illustrates the funding distribution by street functional classification.

Figure 3. Budget Needs Funding
Distribution by Functional Classification



Budget Scenarios

Having determined the maintenance and rehabilitation needs of the City of Oregon City's street network, the next step in developing a cost-effective maintenance and rehabilitation strategy is to conduct 'what-if' analyses. Using the PMP budget scenarios module, the impact of various budget scenarios can be evaluated. The program projects the effects of the different scenarios on pavement condition PCI and deferred maintenance (backlog). By examining the effects on these indicators, the advantages and disadvantages of different funding levels and maintenance strategies become clear. For the purpose of this report, the following scenarios were run for a five (5)-year period.

1. *Unconstrained (zero "deferred" maintenance)* — The annual amounts as identified in the budget needs analysis totaling $34.7 million were input into the budget scenarios module. This scenario shows the effects of implementing the ideal investment strategy (as recommended by the MTC PMP needs module). Because it is more cost-effective in the long run to eliminate the deferred maintenance backlog as quickly as possible, the bulk of the maintenance needs are addressed in the first year of the five-year program. The preventive maintenance split for each year in the analysis period, as recommended by the budget needs module, was used.
2. *Current Investment Level* — A five-year investment level total of $7.527 million was evaluated to determine the effects of at this budget level. $140,000 per year is dedicated to preventative maintenance.
3. *Budget Prior to Street Utility Fee*— A five-year investment level total of $2.5 million was evaluated to determine the effects of at this budget level. $75,000 per year is dedicated to preventative maintenance.
4. *Increase PCI by 5 points* — An investment level of $2.2 million in each year for a total of $11.0 million over five years was evaluated to determine the effects at this investment level. A 10% preventive maintenance split was used for the purpose of these analyses. This proposed funding level increases the network PCI by five points over the five-year analysis period.
5. *Increase PCI by 10 points* — An investment level of $3.6 million in each year for a total of $18.0 million over five years was evaluated to determine the effects at this investment level. A 10% preventive maintenance split was used for the purpose of these analyses. This proposed funding level increases the network PCI by ten points over the five-year analysis period.

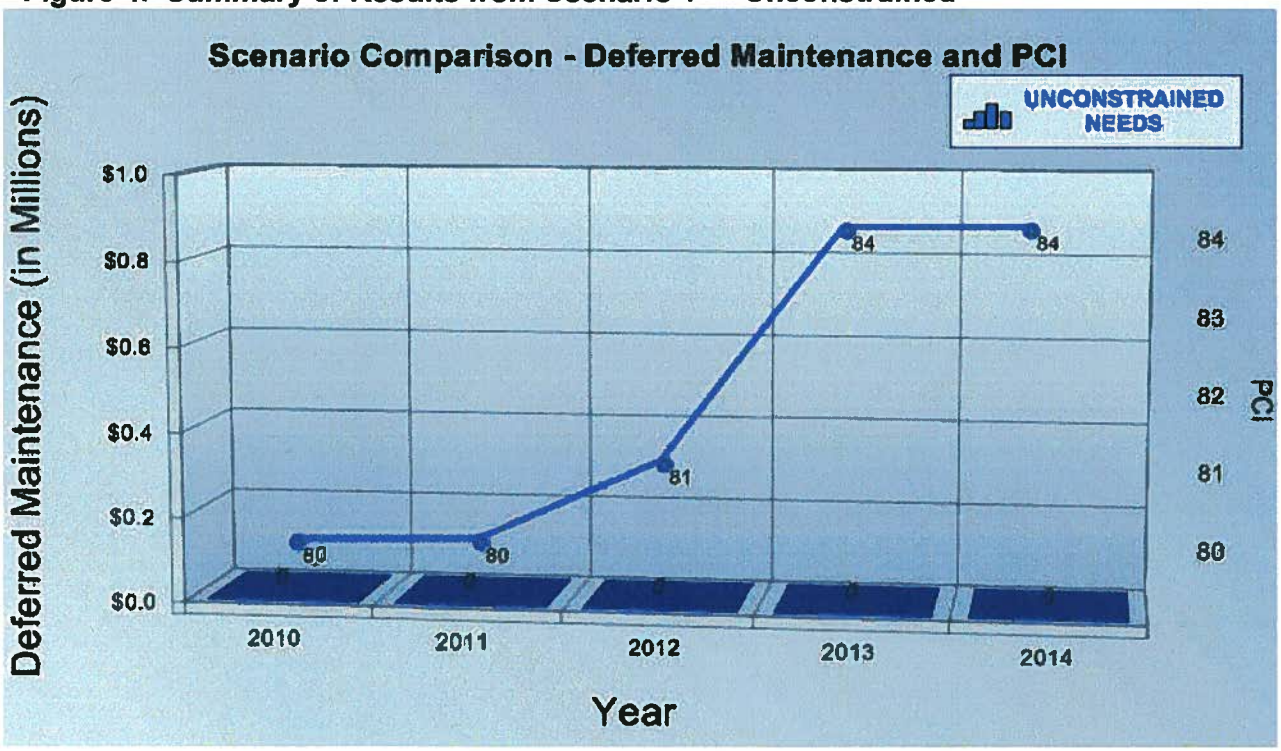
Scenario 1 — Unconstrained *(zero deferred maintenance)*

This scenario shows the effects of implementing the ideal investment strategy (as recommended by the MTC Streetsaver needs module). Because it is more cost-effective in the long run to eliminate the deferred maintenance backlog as quickly as possible, the bulk of the maintenance needs are addressed in the first year of the five-year program, increasing the PCI to 80. The PCI maintains at an optimal level over the entire time period, reaching a PCI of 84 in 2014. By 2014, 93.6% of the network will be in the good condition category, a significant increase from the current level of 47.3% in good condition. These results are shown in both table 4 and figure 4.

Table 4. Summary of Results from Scenario 1 — Unconstrained

	2010	2011	2012	2013	2014	Total
Budget	$17,210,681	$4,114,823	$4,715,921	$5,543,222	$3,118,809	**$34,703,456**
Rehabilitation	$16,804,252	$4,069,551	$4,631,395	$5,357,705	$3,067,335	**$33,930,238**
Preventative Maintenance	$406,428	$45,271	$84,524	$185,516	$51,473	**$773,212**
Deferred Maintenance	$0	$0	$0	$0	$0	---
Stop Gap	$0	$0	$0	$0	$0	**$0**
PCI	80	80	81	84	84	
Condition Category results 2014	Good	Satisfactory	Fair	Poor		
	93.6%	5.4%	1.0%	0%		

Figure 4. Summary of Results from Scenario 1 — Unconstrained



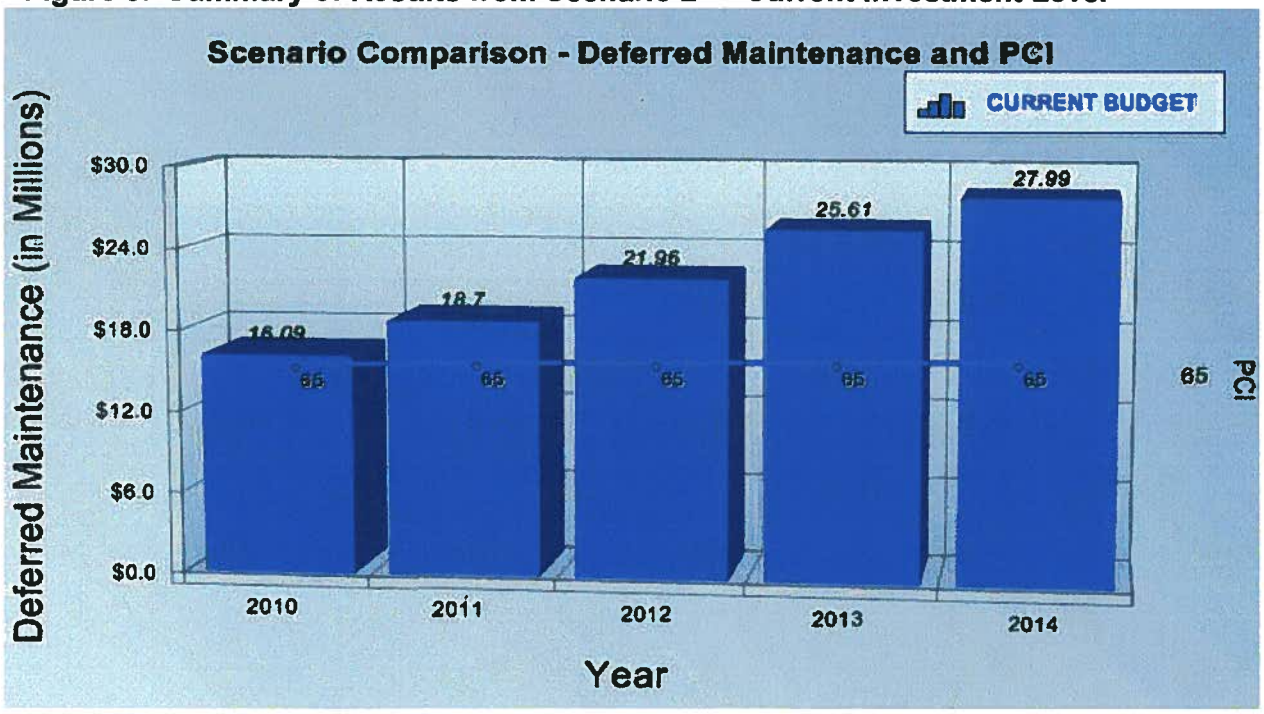
Scenario 2 — Current Investment Level

This scenario shows the effects of the City's current budget strategy, taking into the increased funding made possible by the street utility fee. An investment level of $120,000 per year for five years, totaling $600,000, increases the network PCI by 3 points to 65 in 2014. While the PCI does increase, the deferred maintenance backlog increases by almost $12.0 million over five years, from $16.1 million in 2010 to nearly $28.0 million in 2014, largely due to the increase in streets falling to 'Poor' condition. The large increase in deferred maintenance backlog demonstrates that current funding is insufficient to address all of the City of Oregon City's future street maintenance needs. At the end of this time frame, 66.7% of the street network will be in the 'Good' condition category, though 21.4% will be in 'Poor' condition. These results are illustrated in Table 5 and Figure 5.

Table 5. Summary of Results from Scenario 2 — Current Investment Level

	2010	2011	2012	2013	2014	Total
Budget	$1,124,000	$1,348,000	$1,685,000	$1,685,000	$1,685,000	**$7,527,000**
Rehabilitation	$984,000	$1,204,524	$1,538,262	$1,538,383	$1,544,607	**$6,809,776**
Preventative Maintenance	$139,923	$143,354	$146,493	$146,283	$138,897	**$714,950**
Deferred Maintenance	$16,086,781	$18,704,733	$21,960,732	$25,606,786	$27,986,096	---
Stop Gap	$234,255	$54,150	$51,734	$68,731	$45,471	**$454,341**
PCI	65	65	65	65	65	
Condition Category results 2014	**Good**	**Satisfactory**	**Fair**	**Poor**		
	66.7%	5.8%	6.1%	21.4%		

Figure 5. Summary of Results from Scenario 2 — Current Investment Level



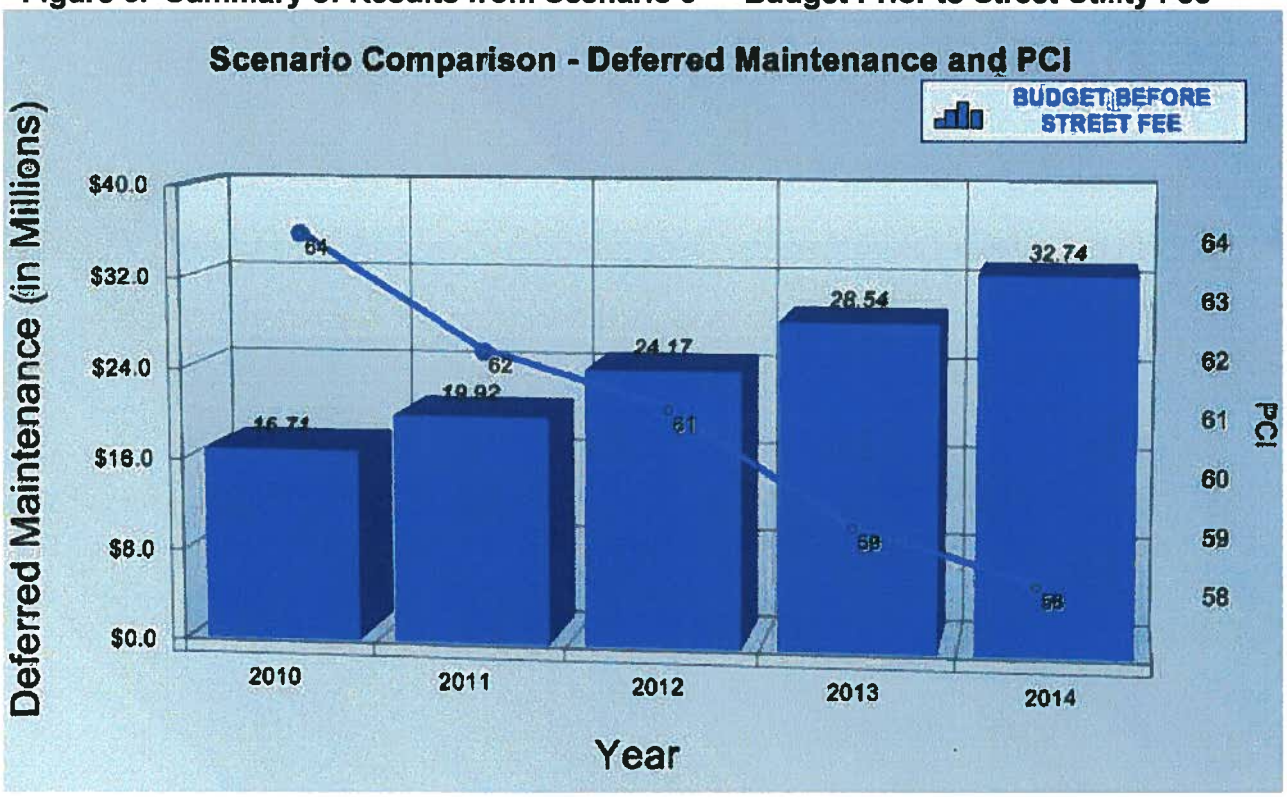
Scenario 3 — Budget Prior to Street Utility Fee

This scenario shows the effects on the street network had the City not implemented increased funding through the street utility fee. If historical funding were to have continued, the city would have been able to spend only $2.5 million over the next five years. Under this funding level, the network PCI level decreases at a rapid rate, by 4 points over five years, eventually reaching 58 in 2014. The deferred maintenance backlog nearly doubles over four years, reaching $32.7 million in 2014. Clearly, the City street network would be in even worse shape in five years had the street utility fee not been implemented. These results are illustrated in Table 6 and Figure 6.

Table 6. Summary of Results from Scenario 3 — Budget Prior to Street Utility Fee

	2010	2011	2012	2013	2014	Total
Budget	$500,000	$500,000	$500,000	$500,000	$500,000	**$2,500,000**
Rehabilitation	$424,995	$424,881	$424,000	$422,600	$422,427	**$2,118,903**
Preventative Maintenance	$75,005	$74,999	$75,878	$77,329	$77,320	**$380,531**
Deferred Maintenance	$16,710,773	$19,918,268	$24,167,243	$28,541,658	$32,738,706	—
Stop Gap	$252,908	$57,328	$60,289	$75,124	$49,742	**$495,391**
PCI	64	62	61	59	58	
Condition Category results 2014	Good	Satisfactory	Fair	Poor		
	55.4%	6.6%	15.5%	22.5%		

Figure 6. Summary of Results from Scenario 3 — Budget Prior to Street Utility Fee



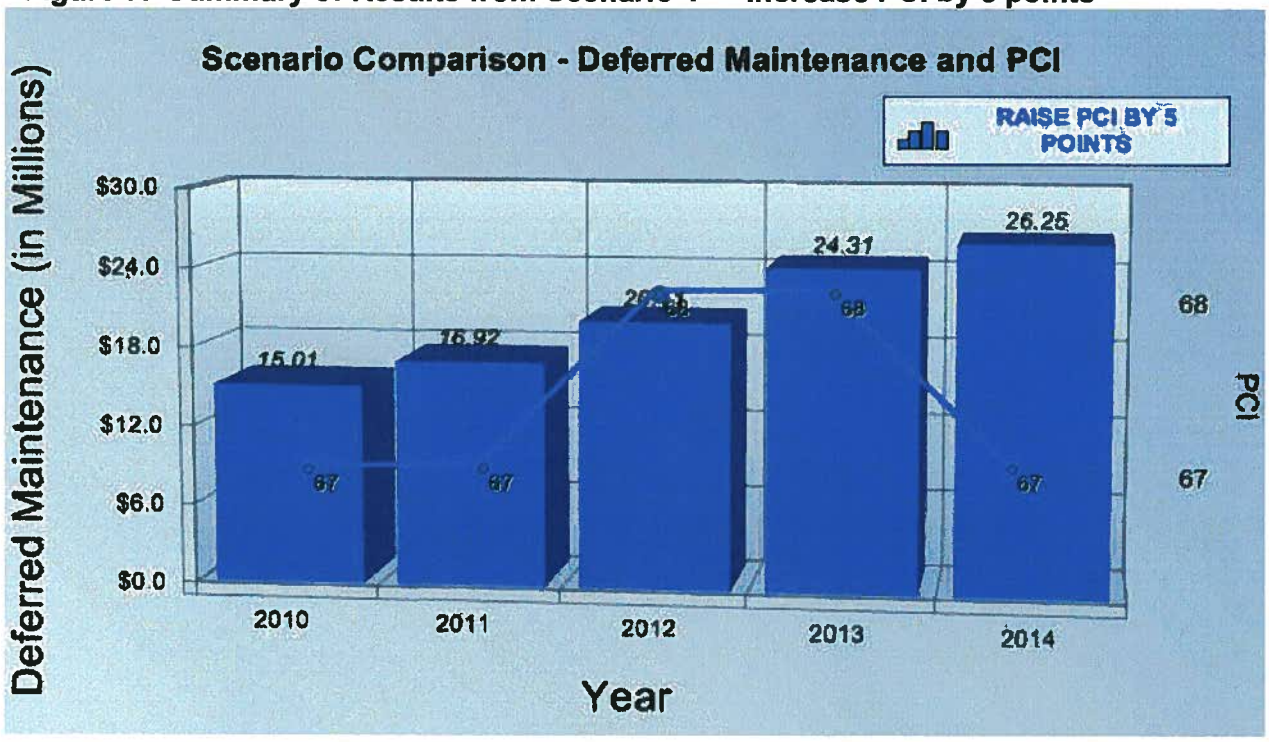
Scenario 4 — Increase PCI by 5 points Investment Level

This scenario examines what would be required increase the current network PCI by five points over the next five years. Investing $2.2 million per year, for a five year total of $11.0 million, would increase the network PCI by five points, to 67, and maintain it there over the entire course of the analysis period. The deferred maintenance still increases under this funding level, to $26.2 million in 2014. At the end of this time frame, 71.5% of the street network would be in the 'Good' condition category. These results are illustrated in Table 7 and Figure 7.

Table 7. Summary of Results from Scenario 4 — Increase PCI by 5 points

	2010	2011	2012	2013	2014	Total
Budget	$2,200,000	$2,200,000	$2,200,000	$2,200,000	$2,200,000	**$11,000,000**
Rehabilitation	$2,023,724	$2,021,611	$2,024,000	$2,024,000	$2,024,000	**$10,117,335**
Preventative Maintenance	$176,276	$178,389	$175,976	$133,628	$44,685	**$708,954**
Deferred Maintenance	$15,010,764	$16,915,913	$20,108,558	$24,308,780	$26,253,616	---
Stop Gap	$217,983	$48,810	$50,653	$65,447	$40,269	**$423,162**
PCI	67	67	68	68	67	
Condition Category results 2014	Good	Satisfactory	Fair	Poor		
	71.5%	5.7%	2.1%	20.7%		

Figure 7. Summary of Results from Scenario 4 — Increase PCI by 5 points



Scenario 5 — Increase PCI by 10 points Investment Level

This scenario examines what would be required increase the current network PCI by ten points over the next five years. An investment level of $3.6 million per year, totaling $18.0 million over five years, would increase the PCI level over the course of five years by 10 points, eventually reaching a network PCI level of 72 in 2014. The deferred maintenance backlog would be $19.1 million, due to 15.6% of the street network that would be in Poor condition. The portion of the network in Good condition would increase from the current level of 47.3%, to 77.7% in 2014. These results are illustrated in Table 8 and Figure 8.

Table 8. Summary of Results from Scenario 5 — Increase PCI by 10 points

	2010	2011	2012	2013	2014	Total
Budget	$3,600,000	$3,600,000	$3,600,000	$3,600,000	$3,600,000	**$18,000,000**
Rehabilitation	$3,236,327	$3,449,007	$3,491,817	$3,416,815	$3,552,764	**$17,146,730**
Preventative Maintenance	$363,673	$89,736	$84,524	$181,216	$45,933	**$765,082**
Deferred Maintenance	$13,610,854	$14,540,820	$16,262,031	$18,857,702	$19,128,359	---
Stop Gap	$204,749	$41,139	$38,716	$41,005	$26,385	**$351,994**
PCI	69	69	70	71	72	

Condition Category results 2014	Good	Satisfactory	Fair	Poor
	77.7%	5.4%	1.3%	15.6%

Figure 8. Summary of Results from Scenario 5 — Increase PCI by 10 points

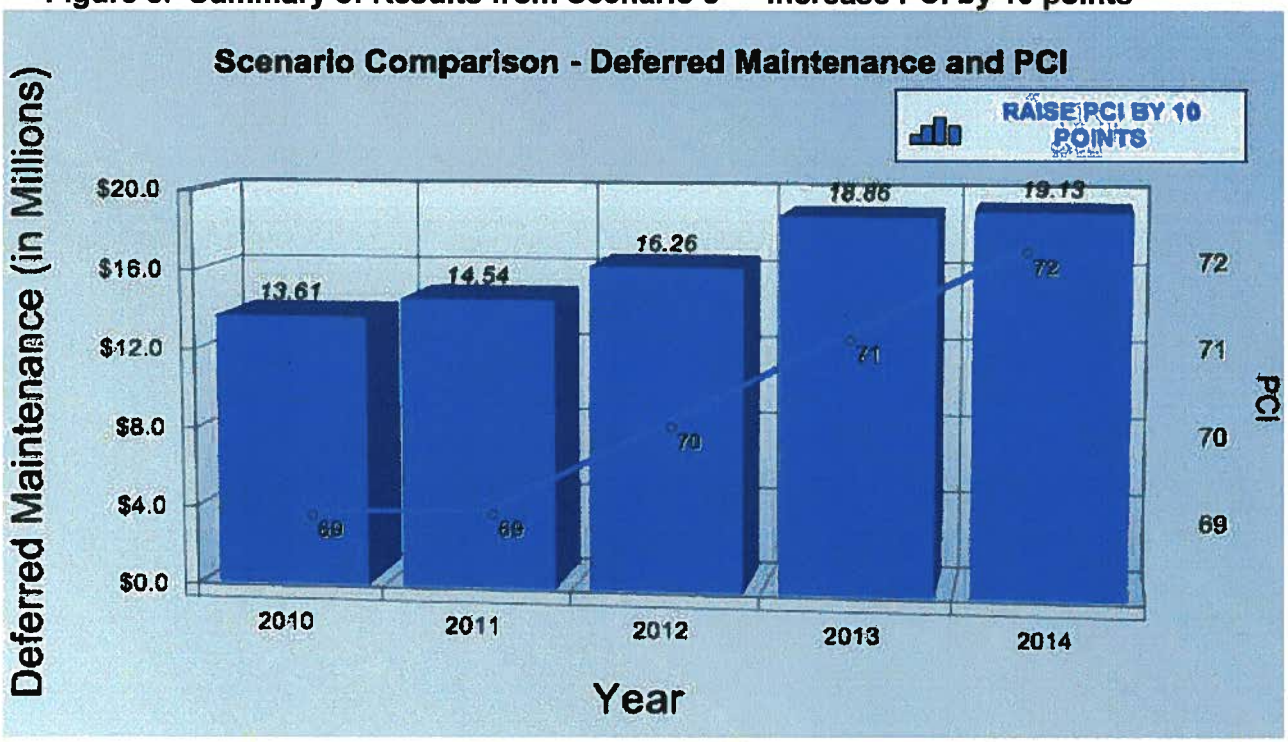
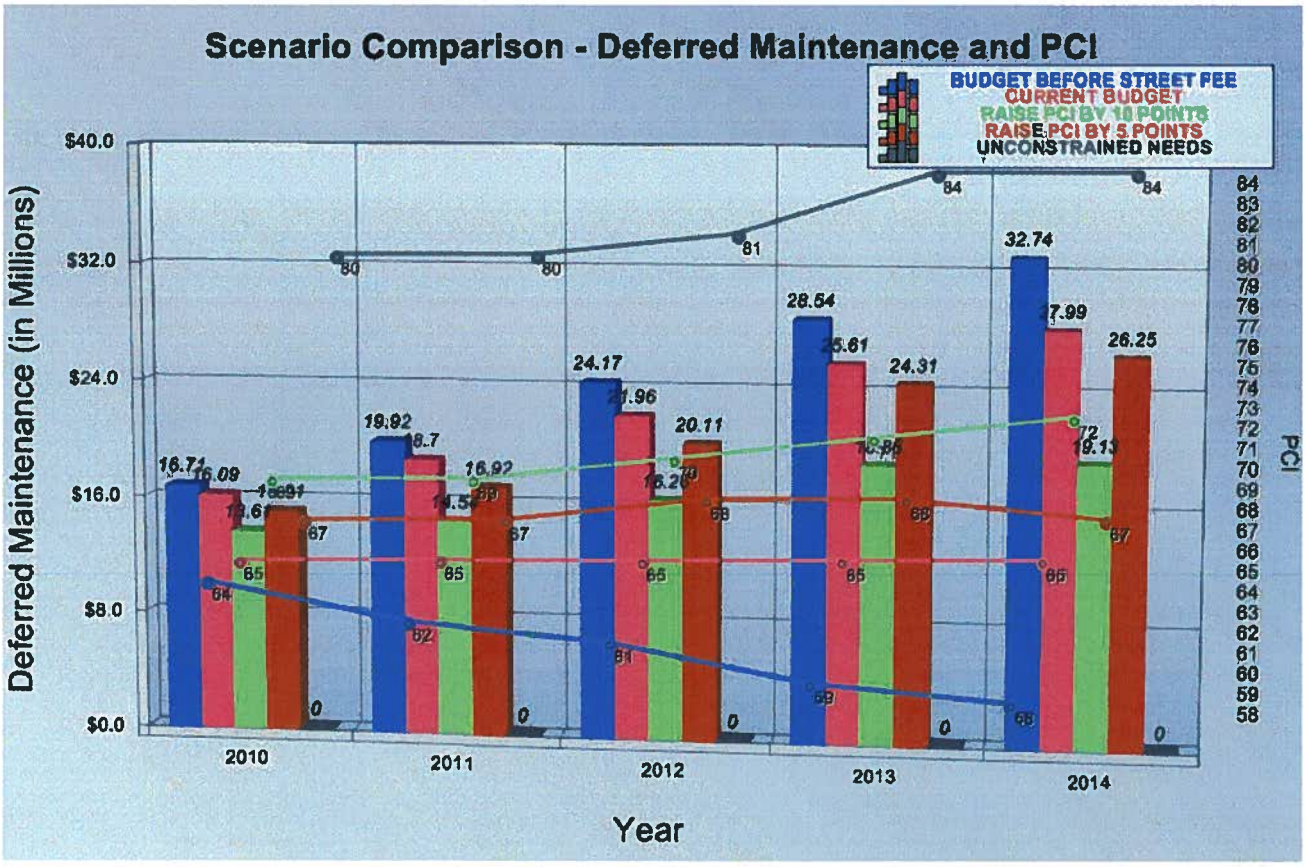


Figure 9. Shows the affects on the PCI at the funding levels analyzed



Recommendations

Of the various maintenance and funding options considered, the *ideal* strategy for the City of Oregon City is presented in Scenario 1, with a five-year expenditure total of $34.7 million. Not only does this surface management plan improve the network PCI to an optimal level of 84, it also eliminates the entire deferred maintenance backlog in the first year. As examined scenarios deviate from this strategy, the cost to Oregon City will increase in the long term. The amount of funds to be dedicated up front, approximately $17.2 million, may make this strategy unrealistic for the City of Oregon City; however, this scenario can be used as a base line for comparing other scenarios.

The current projected five-year funding level totaling $7.5 million (Scenario 2) will result in the current PCI increasing by 3 points, to an average network PCI of 65 over the course of five years. While the PCI does improve, the deferred maintenance price tag will increase to nearly $28.0 million under this scenario by the end of five years. This is clearly an insufficient funding level to maintain the street network at a good level, and as more streets slip into fair and poor condition, the price tag to bring the network back into good condition will rise at an increasingly rapid rate. About two-thirds of the street network will be in Good condition at the end of five years, as this funding level does not allow for more expensive rehabilitation treatments necessary for those streets in Fair and Poor condition, the portion of the street network in Poor condition increases to 21.4%.

While the current budget level will not improve the street network to a Good level, the city is in a better position due to the increase in funding from the street utility fee. If the increase in street maintenance funding made possible by the street utility fee were not implemented, the situation would be worse. With a funding level of $2.5 million over the next five years, the PCI level would decrease by four points, to 58 in the next five year, and the deferred maintenance backlog would increase to $32.7 million. (Scenario 3)

In order to increase the network PCI level by five points over the next five years, a funding level of $2.2 million per year would be required (Scenario 4). A five-year total funding level of $11.0 million would increase the PCI level by five points to 67, and maintain it there over the entire analysis period. The deferred maintenance price tag still increases under this funding level, to $26.3 million in 2014.

To increase the network PCI further, by 10 points, would require further increases in the budget (Scenario 5). A five year total of $18.0 million would increase the PCI to 72 over the next five years, bringing the network average into Good condition. The deferred maintenance level would still increase though, to $19.1 million, due to the fact that this funding level is just over half of what is recommended by the Streetsaver program to bring the street network into optimal condition.

As demonstrated in the different funding scenarios, the City of Oregon City needs to spend a significant amount of money on expensive rehabilitation and reconstruction projects. This will reduce the deferred maintenance backlog, increase the network PCI and allow money to be spent for less capital-intensive treatments such as slurry seals and thin overlays in the future. The more money the City of Oregon City can afford to dedicate to the maintenance of the street

network now, the better the position the City will be in to utilize these more cost-effective preventative maintenance treatments in the future.

The MTC Streetsaver Budget Needs Module is recommending nearly $32.6 million for streets in the fair to poor condition category requiring extensive rehabilitation and reconstruction work which represents approximately 94% of the planning, estimated generated by the program. This result places the City in a challenging position to avoid exponential future street rehabilitation cost and the risk of substantial increase in already significant shortfall projection in the next five years. This conclusion is note worthy to the City Council. Unless funding is allocated to support an increase in the City's street rehabilitation program, the City may lose the opportunity to utilize lower cost preventative maintenance and light overlay treatment options.

Preparation of a budget options report is just one step in using the MTC PMP to build an effective street maintenance program. Some additional steps that should be taken are:

- Link major street repairs with utility maintenance schedules to prevent damage to newly paved street surfaces.

- Obtain detailed subsurface information on selected sections before major rehabilitation projects are contracted. Costs for large rehabilitation projects are extremely variable and estimates can sometimes be reduced following project-level engineering analysis. It is possible that only a portion of a street recommended for reconstruction actually requires such heavy-duty repair.

- Evaluate the specific treatments and costs recommended by the MTC Streetsaver program, and modify them to reflect the actual repairs and unit costs that you expect to use.

- Test other budget options with varying revenues and preventive maintenance and rehabilitation splits.

- Prepare a brief memo to City Officials outlining the recommended five-year maintenance program. The memo should include the amount of revenues available for pavement repair, a list of streets to be repaired, and the type of repair to be completed (listed in order of the year the treatment is scheduled), as well as any requests for specific budgetary actions.

In addition to performing cyclic pavement condition inspections, unit cost information for the applications of various maintenance and rehabilitation treatments should be updated annually in the Streetsaver 'Decision Tree Module'. If this data is not kept current, the City runs the risk of understating actual funding requirements to adequately maintain the street network. It's recommended that the City maintain a pavement inspection cycle that would allow for the inspection of 100% of arterial and collector Streets and 50% of residential streets every two years

The City of Oregon City has completed the foundation work necessary to execute a successful pavement management plan. The street system is in Satisfactory condition, indicating that the City has not consistently applied sufficient funds necessary to maintain this monumental investment. At the current investment level, however, street conditions will continue to deteriorate. To improve the condition of the street system and reduce the maintenance backlog, additional revenues <u>and</u> support from various decision-making bodies are required.

As more 'good' streets deteriorate into the satisfactory and poor categories, the price tag of deferred maintenance will continue to increase. The price tag of deferred maintenance backlog will stop increasing only when enough funds are provided to prevent streets from deteriorating into a worse condition category, or when the whole network falls into the "poor" category (i.e. can not deteriorate any further). At that time, the network would have to be replaced at a cost of $108.9 million.

DKS *Associates*
TRANSPORTATION SOLUTIONS

MEMORANDUM

DATE: April 15, 2010

TO: John M. Lewis, PE, City of Oregon City

FROM: Peter L. Coffey, PE, DKS Associates
Robert Spierling, DKS Associates
Michael Tomasini, EIT, DKS Associates

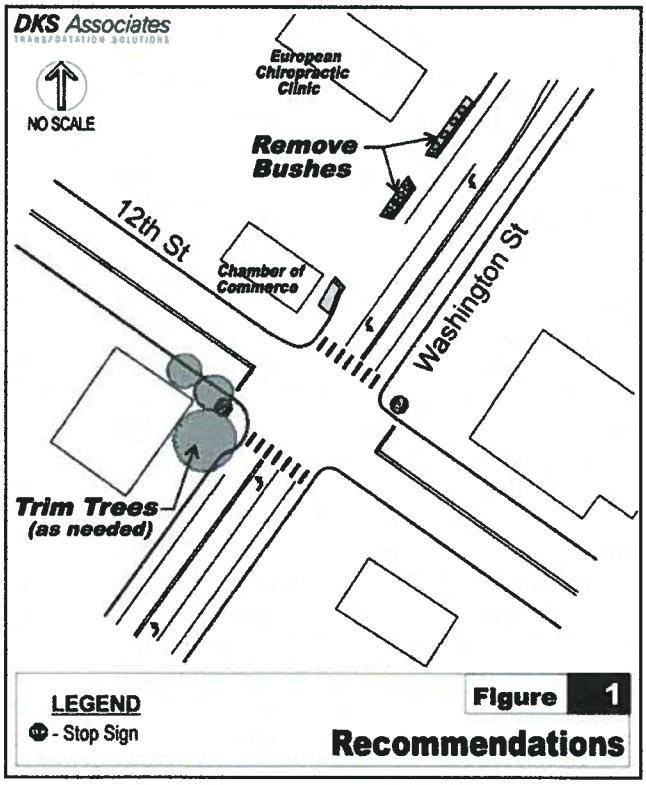
SUBJECT: **Washington Street/12th Street Intersection Analysis** **P09138-000**

The purpose of this memorandum is to investigate the pedestrian and motor vehicle operating environments at the Washington Street/12th Street intersection in Oregon City, and to determine if any safety or operational improvements are recommended at this time.

Summary/Recommendations

Based on a review of the existing conditions at the intersection of Washington Street/12th Street, the following actions are recommended to improve the pedestrian and motor vehicle environment.

- Increase police enforcement to reduce the 85th percentile speed a value closer to the posted speed limit of 25 mph. Today the 85th percentile speed on Washington Street at 12th Street is 33 mph northbound and 31 mph southbound
- Remove the shrubs from the planter strip located immediately north of the Chamber of Commerce driveway and in front of the European Chiropractic Clinic on the west side of Washington Street. (See Figure 1)



- The large trees near the stop sign on the southwest corner of the intersection should be inspected in the summer and trimmed as necessary to maintain stop sign visibility and intersection sight distance to the south.

Existing Conditions

This section of the memorandum covers the existing pedestrian, transit, and motor vehicle conditions at the intersection of Washington Street/12th Street. The following sections identify the existing pedestrian environment, transit service, intersection geometry and traffic control devices, intersection sight distance evaluation, and crash analysis.

Pedestrian Environment

Sidewalks are provided along on both sides of Washington Street and 12th Street, which lead to ADA compliant curb ramps at all corners of the intersection. Bulb-outs are in use at the northwest and southwest corners of the intersection to facilitate pedestrian crossings of Washington Street at the marked pedestrian cross walks. Pedestrian crossing signs are provided for traffic in both directions on Washington Street upstream in advance of the intersections, as well as at the marked crossings in the intersection. Overhead street lighting is provided at the northwest and southeast corners of the intersection.

Transit Service

Transit service is provided by TriMet bus lines 32 and 34. Inbound busses head northbound on Washington Street and turn left onto 12th Street, and outbound busses head southbound on Washington Street. A near side bus stop is provided on the northern leg of the intersection for outbound busses. While at this stop, the bus partially blocks the southbound through lane (a common practice).

Intersection Geometry and Control

The intersection of Washington Street/12th Street is currently stop controlled for the east-west legs (12th Street), and uncontrolled for the north-south legs (12th Street). Dedicated left turn lanes are provided for the northbound and southbound approaches on Washington Street, and shared lanes are provided on the remaining approaches. An overhead flashing beacon signal is installed over the intersection for motor vehicles traveling along both roadways. The flashing beacon signal displays red for 12th Street and amber for Washington Street.

85th Percentile Speed Survey

An 85th percentile speed survey was conducted on Washington Street by the City of Oregon City between the 7th and 13th of January, 2010. The posted speed on Washington Street is 25 mph for both northbound and southbound directions at the study intersection. The survey revealed that the 85th percentile speed for northbound and southbound vehicles was 33 mph and 31 mph, respectively. Speed details are included in Appendix A.

Intersection Sight Distance Analysis

An intersection sight distance analysis was conducted for the eastbound and westbound approaches on 12th Street. The minimum intersection sight distance for a direction is based on the speed of the vehicles on the uncontrolled cross street. Based on AASHTO criteria, the intersection sight distances for 31 mph and 33 mph should be 365 feet and 390 feet, respectively.[1] The available intersection sight distance for westbound and eastbound drivers is shown in Figure 2 and Table 1. Table 1 also lists the required intersection sight distance for the stop controlled approaches at this intersection. The following sections supply detail for the westbound and eastbound approaches of the intersection.

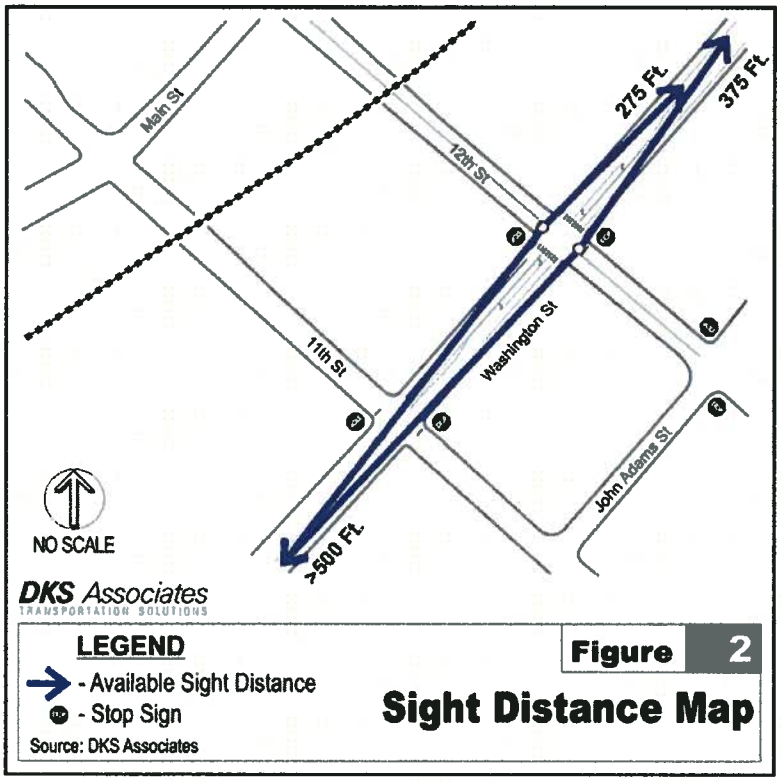


Table 1: Intersection Sight Distance

Approach	North Leg (85th percentile speed 31mph)		South Leg (85th percentile speed 31mph)	
	Available (ft)	Required (ft)	Available (ft)	Required (ft)
Eastbound (west leg →)	**275**	365	>500	390
Westbound (east leg ←)	375	365	>500	390

Note: Grey Shade and **Bold** Indicate the available intersection sight distance is less than the required sight distance.

Source: DKS Associates and AASHTO, *A Policy on Geometric Design of Highways*

[1] *A Policy on Geometric Design of Highways and Streets*, 2004 American Association of State Highway and Transportation Officials, page 661, Exhibit 9-55 and page 659/660 Exhibit 9-54. AASHTO criteria for intersection sight distance sets the driver's eye 14.4 feet

Eastbound Approach (West Leg) – Sight Distance to North

The required intersection sight distance to the north for the eastbound approach is 365 feet. The available intersection sight distance for this approach is currently restricted to 275 feet. The combination of a vertical curve (hill), utility poles, shrubbery (approximately 35 inches tall), and street trees (approximately 10 to 15 feet tall) currently restricts the available intersection sight distance. A single story brick building (City Chamber of Commerce) is located at the northwest corner of the intersection does not limit the intersection sight distance.

The intersection sight distance for the eastbound movement at this intersection was previously improved as part of a project in 2002. In November 2003, after the completion of the project, it was measured to be approximately 370 feet.[2] This measurement was taken when the shrubs and trees in the planting strip were considerably smaller. Since the measurement was taken in 2003, the plants have grown noticeably and reduced the available intersection sight distance by approximately 95 feet.

Eastbound Approach (West Leg) – Sight Distance to South

The required intersection sight distance to the south for the eastbound approach is 390 feet, and the available intersection sight distance (>500) for this approach exceeds the required distance by more than 100 feet. However, it should be noted that limbs from two large trees near the southwest corner of this intersection have grown over part of the adjacent sidewalk. These trees should be routinely trimmed in order to maintain view of the stop sign and not restrict the intersection sight distance.

Westbound Approach (East Leg) – Sight Distance to North

The required intersection sight distance to the north for the westbound approach is 365 feet. The available intersection sight distance (375 feet) is greater than the required 365 feet, but is restricted by a vertical curve (hill). The property on the northeast corner contains several small to medium sized shrubs and trees, which currently do not restrict the intersection sight distance, and the stop sign and "Cross Traffic Does Not Stop" sign are clearly visible to approaching drivers.

Westbound Approach (East Leg) – Sight Distance to South

The required intersection sight distance to the south for the westbound approach is 390 feet. The available intersection sight distance for this approach exceeds the required intersection sight distance and is approximately 575 feet. The property on the southeast corner of the intersection has as elevated garden with medium to large shrubs and trees, which currently do not restrict the available intersection sight distance

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[2] DKS Associates Memorandum-Intersection Sight Distance at the Washington/12th Intersection, to Nancy Kraushaar, City of Oregon City, January 6, 2004

Intersection Crash Analysis

The intersection crash analysis was performed using the last four years of available data for the years (2006 to 2009).[3] Over this time period 14 crashes were recorded in the crash databases for this intersection. This translates to an intersection crash rate of 0.68 crashes per million total entering vehicles (TEV). Intersection crash rates greater than 1.0 per million TEV are generally considered indicators that a further investigation in to the cause of the crashes is needed.

Although the crash rate at this location is well below 1.0, a more in depth crash analysis was conducted. Most of the crashes occurred during the day under dry conditions, and the cause of these crashes was cited as either "no yield" or "passed stop sign." Figure 5 includes a graphical representation of the crash data. A summary of the crash types reported between 2006 and 2009 is as follows:

- Seven (7) crashes involved drivers traveling eastbound on 12th Street and failing to yield the right of way to the drivers traveling on Washington Street.
- Two (2) crashes involved drivers traveling westbound on 12th Street and failing to yield the right of way to the drivers traveling on Washington Street.
- Two (2) crashes involved drivers traveling northbound on Washington Street turning left onto 12th Street.
- Two (2) crashes were rear end type crashes.
- One (1) Pedestrian crash occurred outside of the intersection.

No bicycle crashes were recorded.

Traffic Signal Warrant Analysis

A traffic signal warrant analysis was conducted in accordance with the MUTCD[4] for the intersection of Washington Street/12th Street. This analysis utilized motor vehicle counts collected in January 2010[5], field measurements and observations, and collision data recorded between 2006 and 2009. The MUTCD warrant analysis is a nationally recognized standard for use of traffic control devices and includes studies and factors for justifying traffic control signals. Within the MUTCD are eight separate warrants[6] used to evaluate various conditions specific to the intersection where a traffic signal is being considered. The most significant of the eight warrants that apply to the Washington Street/12th Street intersection are vehicle volume warrants (warrants 1 and 2), and crash experience (warrant 7).

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[3] Crash data supplied by the Oregon Department of Transportation and the Oregon City Police Department for January 2006 through December 2009.

[4] Manual on Uniform Traffic Devices (MUTCD) 2009 Edition

[5] Motor vehicle turn movement counts were collected for the a.m. and p.m. peak hour periods by All Traffic Data on Thursday January 7, 2010.

[6] See Appendix for Warrant analysis from evaluation of Washington Street/12th Street

Vehicle Volume Warrants - The existing traffic volume at this intersection is currently below the threshold levels at which traffic signal would generally begin to improve intersection operation and safety for vehicles and pedestrians , Figures 3 and 4 present the existing traffic volume along 12th Street compared with the levels at which a traffic signal installation is generally considered. When considering the installation of a traffic signal based on traffic (and pedestrian) volumes, a traffic signal will generally introduce greater delay and inconvenience to vehicles and pedestrians. This becomes more apparent at lower traffic volumes when vehicles on the side street must wait for a traffic signal phase (i.e. green light) where as under stop sign control those same vehicles can proceed during gaps in the mainline traffic stream.

Crash Experience - The number of reported vehicle crashes of the type susceptible to correction by traffic signal control (3 in 2009) is below the level at which crash experience is a principal reason for considering the installation of a traffic signal (5 per year). Installation of a traffic signal will generally reduce the occurrence of right-angle collisions. However, intersections controlled by traffic signals generally have a higher incidence of rear-end type collisions than those controlled by stop signs. Installing a traffic signal based solely on crash experience at an intersection with a "moderate" incidence of collisions may not reduce the overall number of collisions but will likely change the types of collisions that occur. Figure 5 shows the reported collisions that occurred at the intersection from 2006 to 2009.

Figure 3 - MUTCD 8-Hour Volume Warrants A and B

2010 side street traffic volume compared with threshold for meeting traffic signal warrant.

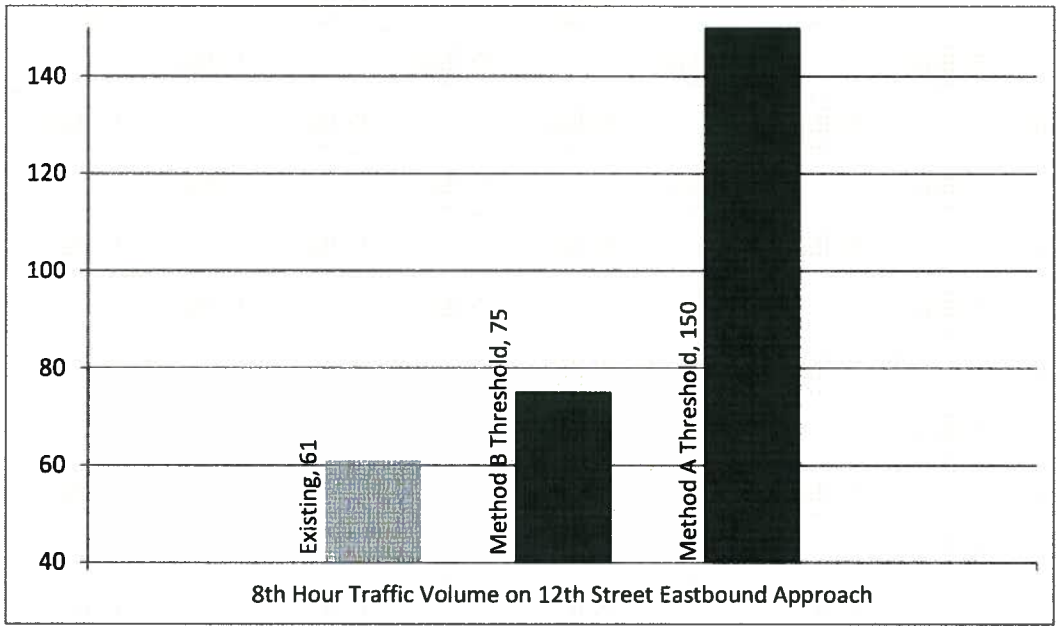

Figure 4 - MUTCD 4-Hour Volume Warrant

2010 traffic volume shown as "X" (892, 78), is below the threshold for meeting the 4-Hour traffic signal warrant.
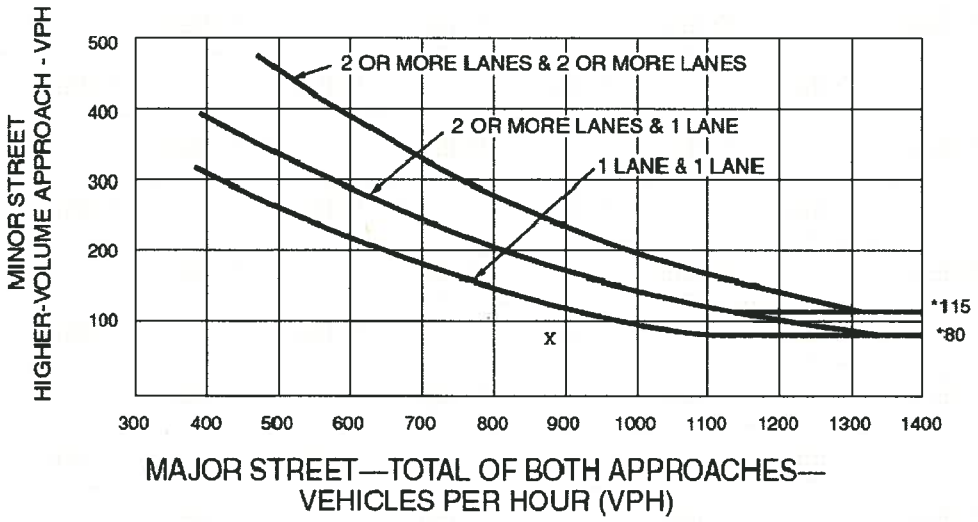
Figure 4C-1. Warrant 2, Four-Hour Vehicular Volume