



Corvallis Area Metropolitan Planning Organization

DRAFT

9th Street Improvement Plan



Prepared by:

Corvallis Area Metropolitan Planning Organization

Financed Jointly by the Oregon

Department of Transportation (ODOT)

and

Department of Land Conservation and Development (DLCD)

Under

Transportation Growth Management (TGM) Program

FY2009

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Acknowledgements

This project was made possible through a grant jointly financed by the Oregon Department of Transportation (ODOT) and the Oregon Department Land Conservation and Development (DLCD) under the Transportation Growth Management (TGM) Program.

Financial assistance was also provided by the City of Corvallis.

Valuable contributions from the following individuals and organizations were crucial to the completion of this project:

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City of Corvallis Community Development Department

Oregon Cascades West Council of Governments (OCWCOG)

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Introduction

Ninth Street is one of the most commercial arterials in the Corvallis Metropolitan Area. The Street also functions as a major carrier of southerly-northerly traffic in the City of Corvallis. This functionality combined with a large number of access driveways that serve a variety of land uses presents challenges to motorists, bicyclists, and pedestrians.

Ninth Street exhibits many of the problems typically associated with commercial strip developments. High traffic volumes and closely-spaced access points are general attributes of strip developments. This situation, in turn will lead to reduced operational efficiency, increased traffic congestion and reduced safety for all users of the arterial.

Realizing this situation, in 2007 transportation officials deemed that a plan should be developed for the improvement of 9th Street. The Corvallis Area Metropolitan Planning Organization (CAMPO) developed an application for the Transportation and Growth Management (TGM) fund for the improvement of 9th Street. This initial application focused on the development of an access management plan for 9th Street. The Oregon Department of Transportation (ODOT) however suggested turning the focus of the project from an access management plan to the development of a comprehensive corridor improvement plan. It took ODOT and CAMPO a year to arrive at a mutually acceptable scope of work for this project.

Several parameters framed the development of the scope of work for this project. First, the TGM Program requires that funded projects include recommendations that would be adopted by the appropriate jurisdiction for implementation. On the other hand, the City of Corvallis City Council, per a policy, does not adopt a recommendation that lacks a reliable funding source. Given the budget constraints at all levels of government, it was evident that the construction of any sizable transportation facility would encounter financial difficulties.

Therefore, the strategies and measures recommended by this effort will be incorporated into the City of Corvallis Land Use Development Code for implementation as part of the City's permitting process. Incorporating any new recommendation into the City of Corvallis Development Code requires the approval of the City Council.

The 9th Street Improvement Plan is developed by the Corvallis Area Metropolitan Planning Organization (CAMPO) in collaboration with the City of Corvallis and the Oregon Cascades West Council of Governments (OCWCOG).

Corvallis Area Metropolitan Planning Organization

The Corvallis Area Metropolitan Planning Organization (CAMPO) is the designated Metropolitan Planning Organization (MPO) for the Corvallis Urbanized Area. The Corvallis Urbanized Area is composed of city of Corvallis, city of Philomath, city of Adair Village and the densely developed urban areas adjacent to these cities (Map I-1).

MPOs are designated by a decree of the governors of states, pursuant to the US Code, Title 23 and 49. In December 2002 the Oregon Governor designated CAMPO as the MPO for the Corvallis Area. MPOs are responsible for transportation planning and programming within the Urbanized Areas. The Policy Board of CAMPO is made up of representatives of the cities of Corvallis, Philomath and Adair Village, Benton County Board of Commission and the Oregon Department of Transportation (ODOT). CAMPO's administrative services are rendered by the OCWCOG.

Purpose of the Study

The purpose of the 9th Street Improvement Plan is to develop strategies for improving the operation of 9th Street for vehicles, pedestrians, bicyclists, and transit services. The objectives of the Project are:

1. To improve the operation of 9th Street for vehicles, pedestrians, bicyclists, and transit services;
2. To develop a 9th Street Improvement Plan that guides future developments, and;
3. To incorporate the 9th Street Improvement Plan into the City of Corvallis Development Code for implementation.

Study Area

This study encompasses approximately 2.2 miles of 9th Street in the City of Corvallis. This is the most commercially developed portion of the street, and it extends from the southern limit that is the Polk Avenue intersection to the northern limit which is the Elk Drive intersection (Map I-2).

Chapter I

Inventory of Existing Conditions

The purpose of this chapter is to provide a snapshot of all transportation and land use features of 9th Street.

The Study Area is primarily a commercial strip with a few residential units located at both ends of the study area. The majority of this roadway is composed of four lanes of traffic (two northbound and two southbound), a center turning lane, two bikelanes (northbound and southbound) and sidewalks on both sides. The northern segment of the street between Hemlock and Conifer Blvd. has four traffic lanes and no center lane. Further north, between Conifer Blvd. and Elks Drive, the number of traffic lanes is reduced to one in each direction with no center lane. The facility includes curb and gutter (Urban Section) throughout the study area with planter strips and curb cuts on most parts.

Ninth Street south of the study area boundary is a narrow four lane residential street with substantial greenery that has little or no resemblance to the northern segment.

Land Use and Zoning

The prevalent zoning designation in the Study Area is commercial. A majority of the commercial activities are in the Mixed Use Community Shopping (MUCS) zone. MUCS are strips of:

“Commercial developments between neighborhood centers that are intended to transition to a more pedestrian and human scale environment. The MUCS zone is intended to provide for retail businesses and commercial and personal service activities of limited sizes..., accommodating both pedestrian oriented uses and a limited number of land uses that are more dependent on automobile circulation.”¹

The southwest quadrant of Beca Avenue intersection is zoned as Minor Neighborhood Center (NC-Minor) and the southwest quadrant of Circle Blvd intersection is zoned as Major Neighborhood Center (NC-Major). Community Centers serve the communitywide shopping and office needs of neighborhoods.

A few parcels south of Fremont Avenue and between Linden Avenue and Conifer Blvd are zoned as Professional and Administrative Office (P-AO). The P-AO Zone “is intended to establish suitable urban areas for diversified office uses in concentrated centers.”²

There are approximately 40 residential units in the Study Area. These are mainly located at both ends of the Study Area and all on the west side of the Street. There are also five vacant lots that have been zoned as residential.

Map I-3 shows the zoning designations of the Study Area.

¹ . City of Corvallis 2006 Land Development Code, Section 3.19.10

² . Ibid, Section 3.11.10

Vacant Land

For the most part the Study Area is fully developed. There are, however, a dozen vacant parcels awaiting future development. Five of these parcels totaling 1.45 acres are zoned for residential use. The remaining seven parcels are zoned for Mixed Use Community Shopping (MUCS). The total size of these seven parcels is 11.87 acres. While most of these parcels are small lots, there is a 7.05 acre lot and a 1.77 acre lot that are vacant.

Major Activity Centers

For the purpose of this Study, major activity centers are clusters of business activities that generate high volumes of trips. Some of the activity centers include a high number of access points. Within the study area four major activity centers were identified. These are shown in Map I-4 and described below:

- **Benton Center/Avery Square Area:** Located at the southern end of the study area, this Activity Center is formed by the Benton Center of the Linn-Benton Community College and the concentration of offices at the Avery Square. A considerable volume of educational and business trips are generated by the college, the Cannery Mall, and the two restaurants. The activity center extends approximately 900 feet along 9th Street from the east leg of Polk Street to the Reiman Street intersection. Two driveways at the either end of the center provide access to an off-the-street parking lot.
- **Corvallis Market Center:** This center begins approximately 200 feet south of the Hayes Avenue intersection and extends 1,700 feet northward. The newly constructed Corvallis Market Center includes several major stores and fast food restaurants that generate a sizable number of trips. Immediately adjacent to the Market Center is the 76 Service Station, three hotels, a movie theatre and a restaurant. This activity center has a fairly limited number of access points. Most of the businesses in this activity center can be accessed from the accesses on Hayes Avenue or Garfield Avenue. By contrast, there are eleven private access points on the east side of the street that serve a variety of small businesses.
- **Circle Intersections Activity Center:** This major activity center includes both the Circle Boulevard/9th Street intersection and the Circle /OR 99W intersection. Two major retail outlets that generate a significant number of trips are located on the east and west sides of the 9th Street (Bi-Mart and Rite-Aid). Additionally the business activities along Circle Blvd and adjacent to this intersection significantly add to the volume of traffic at this intersection. This activity center includes seven private access points onto 9th Street. The Spruce Avenue intersection is included in the activity center.
- **Fast Food Center:** Beginning approximately 700 feet north of the Circle Boulevard intersection, there is a cluster of six fast food restaurants, five of which have drive through windows. The eastern boundary of this activity center includes the intersection of Walnut Boulevard and OR 99W and the north boundary includes a service station and a convenient store south of Conifer Blvd. This major activity center includes nineteen private access points onto 9th Street and five public street intersections. Among these

intersections is the intersection of Walnut Boulevard which is a significant minor arterial in the area's traffic circulation.



Demographics

Methodology

Population and employment data for the 9th Street Study Area was obtained from Transportation Analysis Zones³ (TAZs). These statistics were used for the development of the Corvallis Area Travel Demand Model, a major component of the *Corvallis Area Metropolitan Transportation Plan: Destination 2030* (CAMTP, 2006). The population and employment data for the TAZs have been derived from the US 2000 Census by the aggregation of the Census blocks and Block Groups. The Allocation of these statistics to the TAZs was overseen by the participation of local land use and transportation professionals. The projection data used statistics from the PSU Certified Population Estimates and the Oregon Employment Office.

Fifteen TAZs cover the 9th Street Study Area. These TAZs are shown in Map 1-5. Although the boundaries of the fifteen TAZs largely extend beyond the boundaries of the Study Area, it could be reasonably assumed that the population and employments within these TAZ rely heavily on 9th Street for their socio-economic activities.

Population

The US 2000 Census data shows that 5,632 people live within the TAZs that cover the Study Area. It should be noted that only 17 residential units have direct access to 9th Street and most of this population lives off of 9th Street. CAMPO's demographic projections showed that the TAZs' population is expected to increase by 345 persons to a total population of 5,977 by 2010. Between 2010 and 2030 the population is expected to remain stable with no change. This very limited population growth is due to the fact that the buildable residential land in the TAZs is nearing full build-out status. Table I-1 shows current and projected population for the fifteen TAZs.

Employment

According to the US 2000 Census 3,796 people were employed in the 9th Street TAZs. Table I-2 shows current and projected employment for each TAZ. The service sector had the highest share of this employment. The retail sector was in second place with 18.4 percent (698) of the total employees and manufacturing jobs comprised 15.8 percent of the total.

Projections for future employment levels show that overall job growth should be about 38 percent in the TAZs by 2030, for a total employment level of 5,228 jobs. The greatest period of job growth is expected to occur by 2010 with a 22 percent increase. The percentage of jobs in each of the employment sectors is expected to remain relatively stable during the planning horizon.

There are significant employment centers near 9th Street and beyond the TAZs that cover the Study Area. A portion of the workers in those outlying centers are likely to travel on 9th Street during their commutes. Located north of the study area is the medical complex that includes

³ A brick of model building, a Transportation Analysis Zone (TAZ) is the smallest geographic unit representing socio-economic characteristics of an area.

Good Samaritan Regional Medical Center and the Corvallis Clinic with a combined employment of approximately 2,700 people. The Hewlett-Packard campus east of the corridor is the work site for approximately 2,500.

Table I-1 Current and Projected Population by TAZs				
TAZ	2000	2010	2020	2030
132	315	415	415	415
133	353	353	353	353
134	4	4	4	4
135	408	408	408	408
137	1,027	1,027	1,027	1,027
165	516	516	516	516
180	466	466	466	466
183	514	514	514	514
184	164	164	164	164
185	110	146	146	146
186	27	27	27	27
457	860	969	969	969
458	860	960	960	960
459	4	4	4	4
460	4	4	4	4
Total	5,632	5,977	5,977	5,977

**Table I-2
Current and Projected Employment by TAZs**

TAZ	2000	2010	2020	2030
132	64	153	164	172
133	39	47	50	53
134	371	447	480	504
135	104	125	135	141
137	116	140	150	158
165	410	494	531	557
180	218	263	282	296
183	23	28	30	31
184	42	51	54	57
185	694	837	898	942
186	470	567	608	638
457	186	213	229	240
458	429	517	555	583
459	383	462	496	520
460	182	219	236	247
Total	3,731	4,564	4,898	5,139

Access Inventory

The number and spacing of access points along an arterial directly affect the flow of traffic and safety on that arterial. An outstanding feature of the Study Area is the number of access points that interfere with the flow of traffic. There are 121 private access points on either side of the 2.2 miles of the Study Area. ODOT's guidelines for spacing of access points along a well developed Minor Arterial is a minimum of 660 ft. Appendix I-A shows ODOT's recommended spacing for driveways along different classes of roadways.

Table's I-3 A and B show an inventory of all private access points along the Study Area. The tables shows the number of driveways for each segment, the total land devoted to driveways and the average distance between driveways as measured by GIS technology. The tables also show the number of driveways per 660 ft. which is the recommended spacing for a Minor Arterial.

Some 4,700 feet (41%) of 9th Street curbsides are devoted to driveways. A higher concentration of driveways is on the east side of the street. The segments with the highest concentration of driveways are Beca to Grant and to Hayes on the west side and Walnut to Conifer and Starker to Circle on the east side.

Table I-3 A							
9th Street Access Inventory (East Side), 2008							
Segment	Length of Segment (Ft.)	Existing Private Drive-ways	Total Width of Drive-ways per Segment (Ft.)	Avg. Distance Between Drive-ways (Ft.)	Avg. Drive-way Width (Ft.)	ODOT Recommended No. of Drive-ways per segment ¹	Drive-ways as Percent of Total Segment Length
East Side							
South Project Limit - Polk	164	0	0	NA	NA	NA	NA
Polk - Reiman	892	2	103	125	52	1.5	12%
Reiman - Sunnybrook	471	2	76	132	38	2.8	16%
Sunnybrook - Buchanan	326	1	46	NA	47	2.0	14%
Buchanan - Cornell	970	6	295	96	49	4.1	30%
Cornell - Starker	359	0	0	NA	NA	NA	NA
Starker - Circle	3,920	29	1,219	81	42	4.9	31%
Circle - Walnut	2,017	12	539	90	45	3.9	27%
Walnut - Conifer	1,128	9	374	56	42	5.3	33%
Conifer - Elks	1,366	0	0	NA	NA	NA	NA
Total	11,613	61	2,652				23%
¹ ODOT's Access Management Classification and Spacing Standards (August 1996) recommends one access point per 660 ft of an Urban Minor Arterial.							

**Table I-3 B
9th Street Access Inventory (West Side), 2008**

Segment	Length of Segment (Ft.)	Existing Private Drive-ways	Total Width of Drive-ways per Segment (Ft.)	Avg. Distance Between Drive-ways (Ft.)	Avg. Drive-way Width (Ft.)	ODOT Recommended No. of Drive-ways per Segment ¹	Drive-ways as Percent of Total Segment Length
Polk (Project Limit) - Fremont	503	1	23	NA	23	1.3	5%
Fremont - Buchanan	1,330	10	296	82	30	5.0	22%
Buchanan - Beca	1,102	11	312	55	28	6.6	28%
Beca - Grant	550	6	184	43	31	7.2	33%
Grant - Hayes	755	6	208	59	35	5.2	28%
Hayes - Garfield	596	1	35	NA	35	1.1	6%
Garfield - Spruce	1,773	5	260	163	52	1.9	15%
Spruce - Circle	487	2	70	136	35	2.7	14%
Circle - Sycamore	509	2	122	102	61	2.6	24%
Sycamore - Sequoia	407	2	80	102	40	3.2	20%
Sequoia - Linden	349	2	92	51	46	3.8	26%
Linden - Oak	436	2	82	14	41	3.0	19%
Oak - Walnut	309	0	0	NA	NA	NA	NA
Walnut - Hemlock	444	1	50	NA	50	1.5	11%
Hemlock - Ponderosa	304	1	21	NA	21	2.2	7%
Ponderosa - Conifer	386	0	0	NA	NA	NA	NA
Conifer - Maxine	337	2	61	93	31	3.9	18%
Maxine - Elks	1,036	6	187	96	31	3.8	18%
Total	11,613	60	2,083				18%
Grand Total (Both Sides)	23,226	121	4,735				20%

¹ ODOT's Access Management Classification and Spacing Standards (August 1996) recommends one access point per 660 ft of an Urban Minor Arterial.

The inventory of driveways on 9th Street points to the following:

1. There is a relatively high concentration of access points along the Study Area;
2. The access points in many instances are situated too close to each other;
3. There are access points that are excessively wide;
4. There are business establishments with more than one access driveway.

Transportation Operation

Streets

Ninth Street is an urban minor arterial that connects downtown Corvallis to northwest Corvallis and to some of the highest trip destinations in the area. This relatively busy street serves motorists, transit, bicyclists, and pedestrians as both a thoroughfare and a destination. There are 19 avenues intersecting 9th Street on the west side and ten on the east side. The only aligned four-legged intersections are Buchanan, Circle, Walnut, and Elks. A majority of these avenues form a tee intersection with 9th Street. Several avenues intersect 9th Street at a slight angle and a few of them form misaligned intersections. All intersecting avenues are paved.

Land use on side avenues is generally residential. In few instances there is some commercial use on intersecting avenues, particularly in the area closer to the intersection with 9th Street.

Sidewalks

Sidewalks are generally present on both sides of 9th Street, with the exception of the block between Conifer Blvd and Elks Drive, where only the west side of the Street has sidewalks. Most of the sidewalks are six feet wide, although, wider or narrower sidewalks are common. The sidewalks are either adjacent to the curb or to a planter strip. The sidewalks and planter strips switch sides at different segments of the street.

A notable feature of the sidewalks is their condition. While most property owners maintain their sidewalks in good condition, some have allowed deterioration of the pavement condition and the growth of weeds. This is mostly apparent in front of the vacant parcels. In one or two short segments, the overgrown plants in the planter strip cover a portion of the sidewalks, a situation that poses difficulties to the passage of people on wheelchairs.

Marked Crossings

Marked crosswalks are located at seven intersections in the Study Area. At the Buchanan, Grant, Garfield, Circle, and Walnut intersections crosswalks are present on both 9th street and the intersecting roads. The Polk intersection has crosswalks only on 9th Street. There are no pedestrian islands at any of the intersections.

Bicycle Facilities

There are painted bicycle lanes that are generally in good condition, on both sides of the street for the entire length of the Study Area. The intersecting streets of Buchanan, Circle, Walnut, Conifer, and Elks Drive also have bike lanes. There is a paved bike path that runs parallel to 9th Street approximately 500 feet to the east, between Buchanan Avenue and Circle Blvd. Bike lanes on 10th Street parallel 9th Street to the west.

Transit

Route No. 2 of the Corvallis Transit System (CTS) covers the entire length of the Study Area. Route No. 1 travels between Circle and Walnut Boulevards and Route No. 7 runs on 9th Street, between Circle Blvd and Elks Drive. These routes run on one-hour headways, Mondays through Saturdays. The first daily run begins at 7:15 a.m. and the final run is at 6:15.

The Linn-Benton Loop, an intercity transit service between Albany and Corvallis also serves 9th Street up to Circle Blvd. Appendix B shows the route and the schedule of this shuttle service.

The Study area has 12 transit stops for northbound buses, four of which have shelters. There are 13 transit stops for southbound buses, eight of which have shelters. There is a bus bay on the east side of the Street, between Polk and Fremont Avenues. All other bus stops are on the traffic and bike lanes. The bus bay is used also by school buses. Map I-6 shows the location of bus stops in the Study Area.

Parking

There is no public parking structure on 9th Street, and curbside parking is prohibited along 9th Street. Curbside parking is, however, allowed on the intersecting avenues. The majority of businesses along 9th Street have customer parking in front of their business. Major businesses provide large off-the-street parking lots. Examples of these are parking lots in front of Plaza 9, the Corvallis Market Center, Bi-Mart, and Rite-Aid (See Major Activity Centers).

Traffic Volume

Traffic volume data on 9th Street were gathered near the nine major intersections within the Study Area. Additionally two intersections outside of the Study Area with direct influence on the 9th Street traffic flow were identified. These nine intersections are:

1. 9th Street & Buchanan Ave
2. 9th Street & Grant Ave
3. 9th Street & Garfield Ave
4. 9th Street & Circle Blvd
5. 9th Street & Walnut Blvd
6. 9th Street & Conifer Blvd
7. 9th Street & Elk Dr
8. OR 99W & Walnut Blvd (Influencing Study Area)
9. OR 99W & Circle Blvd (Influencing Study Area)
10. OR 99W & Elks Drive
11. OR 99W & Conifer Blvd

Thirtieth Highest Volume and 14-16 Hours Turning Movements were collected for the above eleven intersections. A more detailed analysis of traffic volumes is provided under intersection analysis, as these counts are taken in the vicinity of intersections.

Major Trip Generators

The total traffic volume on 9th Street includes vehicles that pass through the study area and traffic generated by the business along 9th Street. It is important to identify the businesses that generate a high number of trips to understand the traffic characteristics of the study area. Not only does trip generation by individual businesses contribute to overall traffic volume, but ingress and egress to these businesses interferes with the flow of traffic and causes traffic safety problems for vehicles and pedestrians.

For this study, major trip generators have been identified through use of the Institute of Transportation Engineers (ITE) Trip Generation, 7th Edition manual. The ITE publication provides estimates of the number of trips that specific types of land uses will generate on a daily basis, as well as during the evening (PM) peak hours. PM peak is selected because it generally represents the highest volume of traffic in 24 hours. Major trip generators are defined as facilities that are estimated to generate 100 or more gross trips during the peak P.M. hours. It should be noted that these estimates are based on a few samples from across the country and may not necessarily correspond to the specific characteristics of land uses on 9th Street. Nonetheless, the ITE Trip Generation is the only recognized tool of the trade across the country. Table I-4 shows major trip generators along 9th Street.

Fast food outlets are the dominant type of major trip generator in the study area with eight restaurants generating a total of 1,200 PM peak trips. Six of those restaurants are concentrated within a 950 foot segment of the corridor.

Rite Aid generates 488 peak PM hour trips which is the highest number for any single site in the corridor. Border's Books is the second largest trip generator with 431 P.M. peak hour trips. The Corvallis Market Center is not currently fully occupied, however based on square footage of the Center it will be the third largest trip generator with 305 PM peak hour trips when it is fully occupied. The fourth highest number of trips is generated by the OSU Federal Credit Union with 303 trips.

**Table I-4
Major Trip Generators, 2008**

Trip Generator	Address	ITE # (Land Use Category)	Trip Generation Factor ¹	Trips	
				Weekday	Weekday P.M. Peak Hour
TG Market	1621 NW 9th St.	852	2,832	NA	103
Taco Bell	2235 NW 9th St	934	2,204	1,093	103
76 Filling Station/Convenience Store	1450 NW 9th St.	945	8 pumps	1,302	109
Elmer's Restaurant	1115 NW 9th St.	932	5,887	749	111
Izzy's Restaurant	2475 NW 9th St.	932	6,041	768	114
Goodwill Store	800 NW Starker Ave.	815	20,960	1,174	114
Wendy's	2300 NW 9th St.	934	2,599	1,289	121
Shell Filling Station	2635 NW 9th St.	944	8 pumps	1,348	125
Baja Fresh	839 NW 9th St.	933	2,399	1,718	126
Chevron Filling Station/Convenience Store	1334 & 1340 NW 9th St.	945	10 pumps	1,628	136
McDonald's	2250 NW 9th St.	934	3,174	1,575	148
Subway	2350 NW 9th St.	933	2,860	2,048	150
Kentucky Fried Chicken	1775 NW 9th St.	934	3,233	1,604	151
Regal Cinema	1750 NW 9th St.	444	4 screens	NA	151
7-11 Convenience Store	2641 NW 9th St.	851	2,842	2,097	152
Togo's Sandwiches	2317 NW 9th St.	933	2,960	2,119	155
Carl's Jr.	800 NW 9th St.	934	3,484	1,728	163
Arby's	2503 NW 9th St	934	3,848	1,909	180
Burger King	2408 NW 9th St.	934	3,960	1,965	185

**Table I-4
Major Trip Generators, 2008**

Trip Generator	Address	ITE # (Land Use Category)	Trip Generation Factor ¹	Trips	
Linn-Benton Center	757 NW Polk Ave.	540	1,567 students	1,880	188
Plaza 9 Center	1829 to 1897 NW 9th St.	814	37,720	1,672	189
BiMart	2045 9th St.	815	36,087	2,022	196
Avery Square	815 NW 9th St.	710	550 employees	1,826	253
OSU Fed. Credit Union	1980 NW 9th St.	912	4 auto-teller lanes	1,645	303
Corvallis Market Center ²	1500 NW 9th St.	820	81,236	3,488	305
Border's Books	777 NW 9th St	868	22,077	NA	431
Rite Aid ³	922 NW Circle Blvd.	880, 820, 816, 850, 710, 150	82,296	NA	488

¹ Unless noted otherwise, trip generation factors are shown as gross square footage of buildings
² Currently not fully occupied. "Trips" generated are based on full occupancy of existing structures.
³ "Trips" generated derived from a site development study/proposal completed on 11/5/2007.

Crash Study

For purposes of this study, five years of crash history (2003 through 2007) on 9th Street was analyzed. The data used for the analyses was compiled by ODOT's Crash Analysis and Reporting Unit from reports submitted by individual drivers and police crash reports.

During the five year period there were a total of 216 crashes on 9th Street. There were also six "intersection related" crashes on intersecting streets that were included in the analysis.

Overall, the crash data seems consistent with the type of traffic that is generally observed in the study area. The many driveways and intersections along 9th Street generate a high number of turning movements, as well as vehicles stopping in travel lanes as they wait to turn. Table I-5 shows that intersections and areas within 50 feet of intersections were the primary crash locations. Crashes within intersections combined with other crashes that were intersection related accounted for more than 48 percent (107 crashes) of the 222 crashes in the study area. An additional 18.5 percent (41 crashes) of crashes occurred within 50 feet of an intersection. Map 7 identifies the locations of the crashes.

Three intersections, Circle, Conifer, and Buchanan were the sites of more than 54 percent of all intersectional, and intersection related crashes. The Circle intersection with 27 crashes had the most crashes, followed by Conifer with 17 crashes and Buchanan with 14 crashes.

There were 202 crashes between vehicles, 14 bicycle/vehicle crashes, 4 pedestrian/vehicle crashes, and one vehicle crash with a fixed object. One of the pedestrian crashes was fatal while 90 crashes resulted in non-fatal injuries.

The Statewide Crash Data System used by ODOT assigns a “collision type” to each crash. The collision type describes, “the physical relationship of the vehicle(s) at the time of collision based on their intended path of travel.” Two types of collisions in the study area accounted for more than 75 percent of all collisions. Over the five year period, there were 98 (44 percent) turning movement collisions and 69 (31 percent) rear end collisions. Angle collisions, which occur when one vehicle attempts to cross the path of an oncoming vehicle by entering the roadway from an intersecting street or a driveway, were the third most prevalent collision type with 24 occurrences. The remaining 31 crashes were represented by a variety of collision types including head-on, pedestrian and side-swipes. Table I-6 shows all of the collision types.

The predominant cause of crashes in the study area, shown in Table I-7, was the failure of drivers to yield the right of way, which caused 81 crashes or 36.5 percent of the crashes. Following too closely was the cause of 54 crashes (24.3 percent). Disregarding traffic signals, improper lane changes, and improper turns accounted for a total of 50 more crashes.

**Table I - 5
Crashes by Distance from Intersecting Street, 2003 - 2007**

Intersecting Street	Within intersection or intersection related	1 to 50 feet from intersection	More than 50 feet from intersection	Total
Polk St.	5	2	1	8
Fremont St.	1	0	1	2
Reiman Ave.	0	0	2	2
Buchanan	14	9	6	29
Cornell St.	2	0	1	3
Starker St.	1	1	0	2
Grant Ave.	9	3	3	15
Hayes Ave.	1	2	2	5
Garfield St.	7	3	5	15
Spruce St.	5	5	13	23
Circle Blvd.	27	11	31	69
Sycamore St.	1	0	0	1
Sequoia Ave.	2	1	1	4
Linden Ave.	1	1	0	2
Oak St.	1	0	0	1
Walnut Blvd.	10	2	7	19
Hemlock Ave.	1	0	0	1
Conifer Blvd	17	1	1	19
Elks Dr.	2	0	0	2
Total Crashes	107	41	74	222

Table I-6 Crashes by Collision Type, 2003-2007		
Collision Type	Number	Percent
Turning movement	98	44.1%
Rear-end	69	31.1%
Angle	24	10.8%
Sideswipe-overtaking	18	8.1%
Backing	4	1.8%
Pedestrian	4	1.8%
Sideswipe-meeting	2	0.9%
Fixed or other object	1	0.5%
Head-on	1	0.5%
Miscellaneous	1	0.5%
Total	222	100.0%

Note: Fourteen of the crashes involved bicycles.

Table I-7 Crashes by Cause, 2003-2007		
Cause	Number	Percent
Didn't yield right of way	81	36.5%
Followed too closely	54	24.3%
Disregarded R-A-G traffic signal	18	8.1%
Improper turn	16	7.2%
Improper lane change	16	7.2%
Inattention	13	5.9%
Speed too fast for conditions (not exceeding limit)	8	3.6%
Passed stop sign	6	2.7%
Other improper driving	6	2.7%
Improper overtaking	2	0.9%
Other (not improper driving)	1	0.5%
Inadequate or no brakes	1	0.5%
Total	222	100.0%

Traffic Signals

There are seven traffic signals within the 9th Street Study Area. These are at Polk, Buchanan, Garfield, Circle, Walnut, Conifer and Elks. The traffic signals at Buchanan, Garfield, Circle, Walnut and Elks are fully actuated for vehicles (underground loop) and for pedestrian (pedestrian buttons). These traffic lights are equipped with opticom signal for emergency vehicles. The Polk Avenue traffic signal is for pedestrian crossing only and is located at a midpoint between the eastern and western legs of Polk Avenue which are about 60 feet apart. The location of this traffic light has been a source of confusion, particularly to the vehicles turning from east to south. The traffic signals on 9th Street are not synchronized.

Table I-8 shows an inventory of traffic lights within the Study Area.

Table I-8 Traffic Signals on 9th Street					
	Intersection	No. of Phases	Loop Actuated	Pedestrian Actuated	Opticom
1	Polk Ave	NA	No	Yes	Yes
2	Buchanan Ave	6	Full	Yes	Yes
3	Grant Ave	5	Full	Yes	Yes
4	Garfield Ave	6	Full	Yes	Yes
5	Circle Blvd	8	Full	Yes	Yes
6	Walnut Blvd	8	Full	Yes	Yes
7	Conifer Blvd	NA	No	No	NA

Intersection Operation Analysis

The consulting firm of PTV America is currently working on this section

Chapter I

MAPS