

CHAPTER 4: CURRENT TRAFFIC CONDITIONS

As part of the planning process, the current operating conditions of the Philomath transportation system were evaluated.

TRAFFIC VOLUMES

Existing 1996 traffic volumes were determined along all arterial and collector streets, well as critical local streets in the Philomath area. This was done by collecting current and recent traffic volume information. Such information includes the 1991 Corvallis/Philomath traffic model (both ADT and PM peak hour model output), traffic volume information from the *1994 Neabeack Development Traffic Impact Study*, 1995 ADT volumes collected by Benton County, ODOT's 1996 *Daily Traffic Volume Tables*, daily road tube counts performed by the Philomath Department of Public Works in September 1997, and turning movement counts performed by the Philomath Department of Public Works at various intersections in April 1998.

Average Daily Traffic

The 1996 average daily traffic (ADT) volumes on the major streets in Philomath are illustrated in Figure 4-1.

Highway 20/34 (Main Street) is the major traffic facility in Philomath, with ADT volumes ranging between 12,000 vehicles per day (vpd) and 14,900 vpd within the city limits. In 1995 and 1996, this section of highway experienced moderate growth as volumes increased by about 3.7 percent each year.

West of the city limits, US Highway 20 and OR Highway 34 separate and ADT volumes reached 9,000 vehicles on US Highway 20 to the west, and 3,700 vehicles on OR Highway 34 to the southwest.

Nineteenth Street, north of Main Street, is classified as a major collector, with ADT volumes between 4,000 and 4,500 vehicles.

Other streets, which parallel Main Street (such as Applegate Street and College Street) or intersect at Main Street reached ADT volumes up to around 3,000 vehicles.

Hourly Traffic Patterns

Generally, traffic volumes on Philomath roadways peak twice each day, with an AM peak around 7:00 to 8:00 a.m. and a PM peak in the late afternoon around 4:30 to 5:30 p.m.

The hourly traffic patterns at the key intersection of US Highway 20 at OR Highway 34 in Philomath are shown in Figure 4-2. These patterns are based on the 12-hour turning movement count performed by City of Philomath employees in April 1998. This intersection has been identified as one of the high traffic activity spots in the Philomath area.

Analysis of this intersection revealed that traffic volumes increase sharply in the morning, peaking at about 900 vehicles per hour (vph) around 7:00 a.m., then dropping down to 650 vph until increasing again to around 1,000 vph around 4:00 p.m.

Weekday PM Peak Hour Volumes

Observing the hourly traffic patterns from the manual turning movement counts taken at all key intersections, the period of highest activity for an average weekday in Philomath seems to occur between 3:00 and 6:00 p.m.; therefore, testing and evaluating the street system was based on the PM peak hour in this time interval.

Directional PM peak hour volumes for 1996 are shown on Figure 4-3.

Many of the traffic volumes displayed in the figure have been taken directly from the 1991 Corvallis/Philomath EMME/2 traffic model as the traffic volumes for this period more accurately represent conditions for 1996. These volumes were checked against more recent available traffic volume information and traffic counts by city staff.

However, the traffic volumes along two sections of state highways have been manually adjusted to reflect more accurate volumes for 1996. These sections are located along US Highway 20 west of the Alsea Highway intersection, and Highway 20/34 east of the Alsea Highway intersection. A comparison between the 1991 model output and existing 1996 ADT volumes at these two locations showed that the 1991 model volumes were overestimated. These volumes were, therefore, adjusted to represent more reasonable numbers, using a peak hour percentage of ten percent of the ADT.

The traffic pattern for the PM peak hour is similar to the daily traffic patterns. Traffic volumes are highest on the two state highways and North 19th Street. Volumes on these roadways steadily increase as the roadways approach the downtown core from the outlying area.

TRAFFIC OPERATIONS

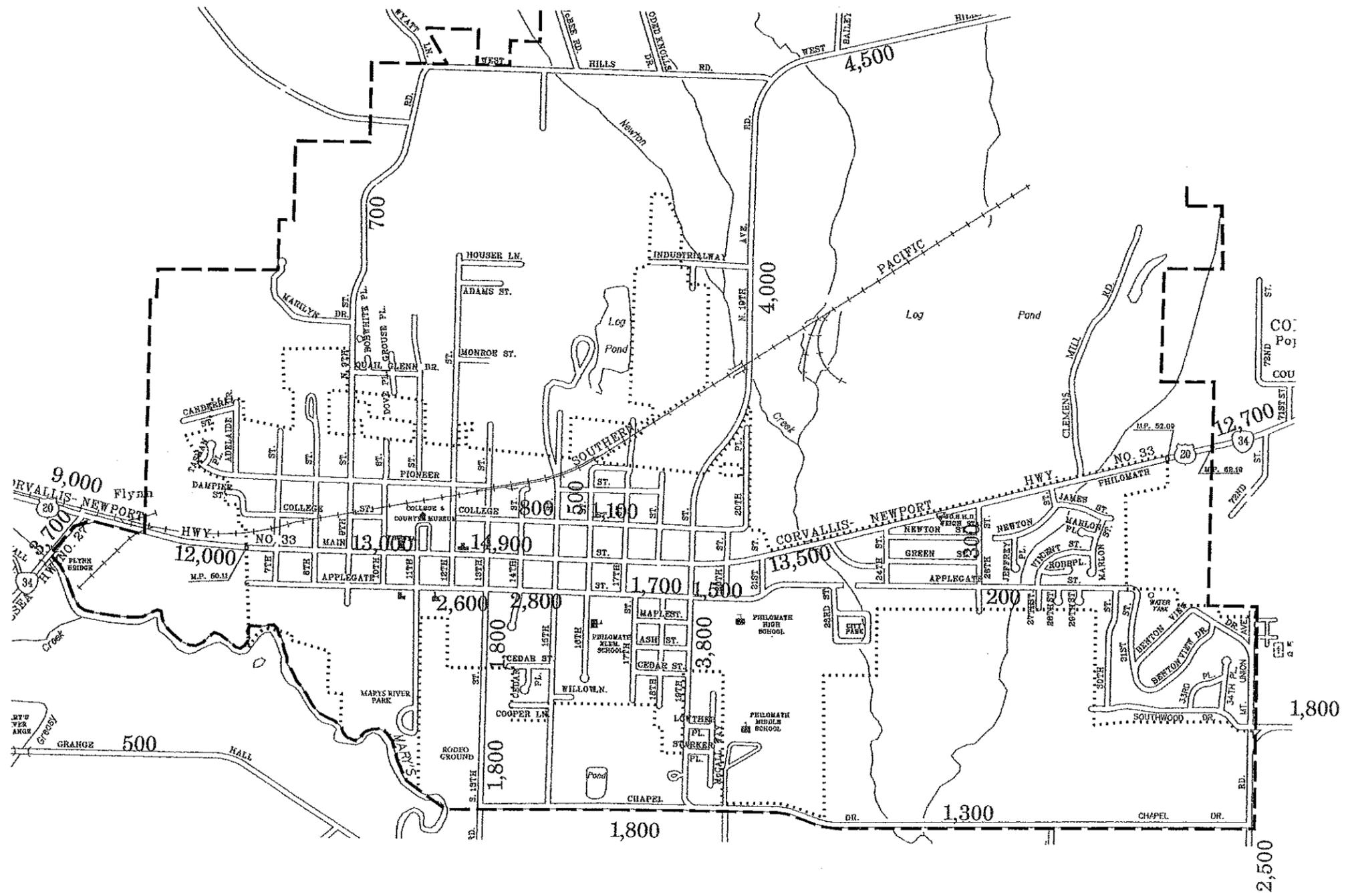
Transportation engineers have established various standards for measuring the traffic operations of intersections and roadways. Each standard is associated with a particular level of service (LOS). The LOS concept requires consideration of factors that include traffic demand, capacity of the intersection or street, delay, frequency of interruptions in traffic flow, relative freedom for traffic maneuvers, driving comfort, convenience, and operating cost. Six standards have been established ranging from LOS "A" where traffic flow is relatively free flowing to LOS "F" where the street system is totally saturated with traffic and movement is very difficult.

The minimum operating standards for streets and intersections in most city jurisdictions in Oregon require a LOS standard of D or better. This standard represents conditions where delays may be long, but not excessive, and only occur temporarily during peak periods. Highway 20/34 in Philomath is also designated as a highway of statewide importance in the OHP. For this type of highway to be located in an "Urban" or "Part of a Metropolitan Area," the OHP requires a design standard of LOS D or better. Some speculation may be made about the urban characteristics of the Philomath area, but the city does have an Urban Growth Boundary and is expected to be a part of the Corvallis Metropolitan Planning Organization (MPO) area well within the 20-year planning period of this study. Therefore, acceptable standards for minimal levels of service should be LOS D or better along all roads and at all intersections in the Philomath area.

Existing traffic operations were determined along key roadway sections and at critical signalized and unsignalized intersections in Philomath to determine if this minimal level-of-service standard is met.

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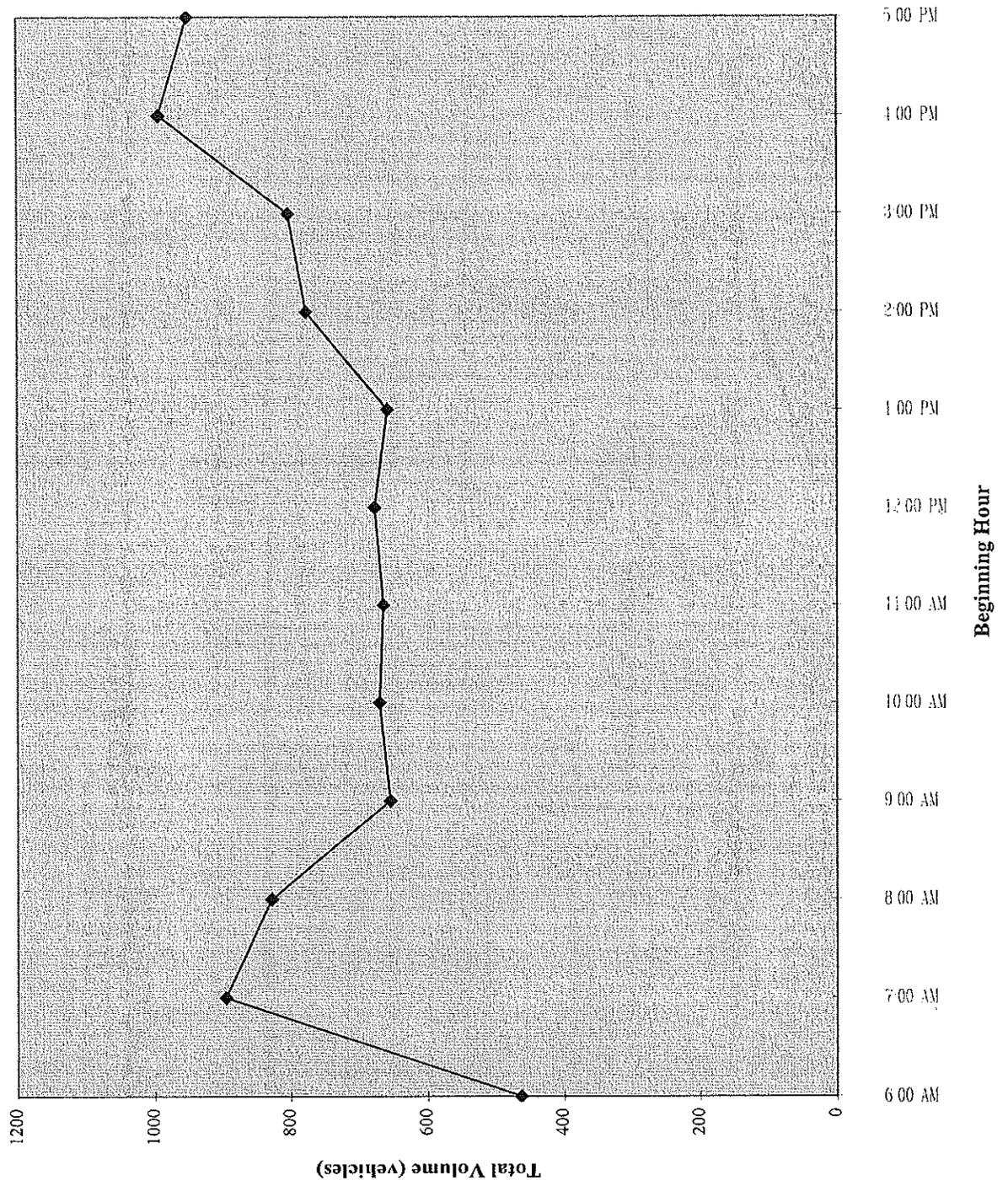
LEGEND:
 - - - URBAN GROWTH BOUNDARY
 CITY LIMITS
 2,000 ADT VOLUMES



ODOT0254/FIG4-1.DGN/TNT/06-16-98

FIGURE 4-1
1996 ADT Volumes

FIGURE 4-2
HOURLY TRAFFIC PATTERNS
US Highway 20 at OR Highway 34
(April 1998)

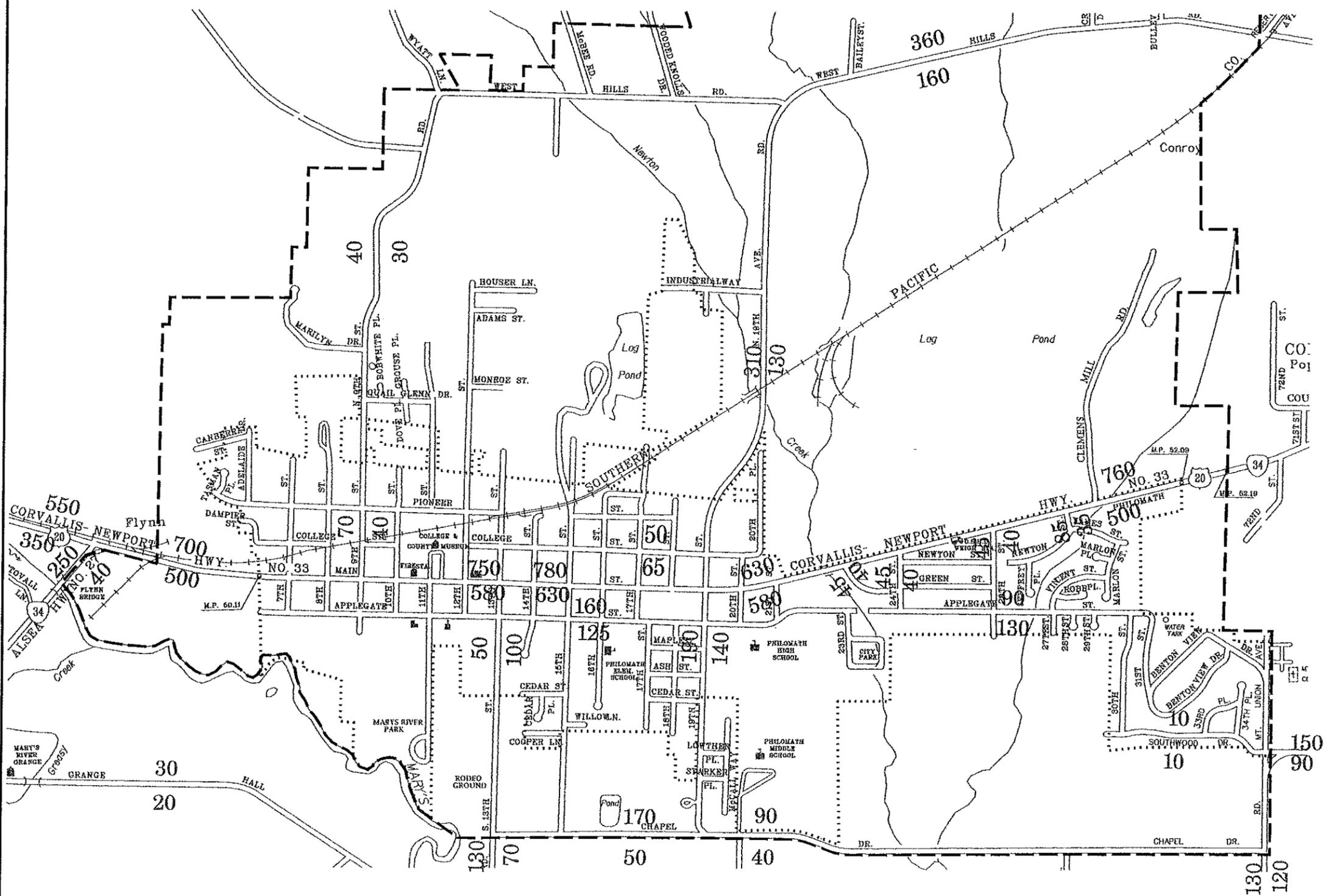




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LEGEND:

- URBAN GROWTH BOUNDARY
- CITY LIMITS
- 450 WESTBOUND VOLUME
- 500 EASTBOUND VOLUME
- 450 SOUTHBOUND VOLUME
- 500 NORTHBOUND VOLUME



ODOT0254/FIG4-3.DGN/TNT/06-16-98

FIGURE 4-3

1996 PM Peak Hour
Traffic Volumes

Roadway Capacity

An analysis was performed to determine if any capacity deficiencies currently exist along key streets in the Philomath area. One way to assess this is to observe the volume-to-capacity (v/c) ratios along sections of the roadway in question. The v/c ratio is a measure of a roadway's capacity to the traffic demand on that road. It can be determined by dividing the PM peak hour traffic demand for a given roadway segment by the roadway's hourly capacity. The capacity of a roadway is based on geometrical characteristics such as the number of travel lanes, the presence of left-turn lanes, and design speed. It is also based on the amount of delay expected due to congestion or its location within a rural or urban environment. A description of the hourly capacities used and the traffic model plots are included in Appendix E.

Roadway Operations

One area of particular concern in Philomath is along Highway 20/34 (Main Street) between the Alsea Highway and 19th Street where traffic volumes and congestion are higher than in any other part of the city.

Analysis of existing traffic volumes and v/c ratios from the EMME/2 model reveal that a section of Highway 20/34, from the Alsea Highway to 19th Street, is currently experiencing heavy traffic flow and congestion during the PM peak hour. Between the Alsea Highway and 13th Street, actual v/c ratios range between 0.62 and 0.87 during the PM peak hour. Traffic operations along this section of highway are expected to be at LOS C to D during this period. Between 13th Street and 19th Street, v/c ratios range between 0.79 and 0.97, indicating that traffic operations are worse, most likely at a LOS E or F.

The draft of the *Benton County Transportation System Plan*¹ indicates that a LOS C exists for the highway between the Alsea Highway and 13th Street and a LOS E exists between 13th Street and 19th Street, which indicates conditions are slightly better than the v/c ratio analysis indicates.

East of 19th Street and inside the city limits, v/c ratios range between 0.60 and 0.88, indicating a moderate level of congestion (LOS C to D).

Intersection Operations

The existing traffic operations were determined at several key signalized and unsignalized intersections in the Philomath area. A total of seven key intersections have been identified for operations analyses. These intersections include:

- US Highway 20 at OR Highway 34
- Highway 20/34 (Main Street) at 13th Street
- Highway 20/34 (Main Street) at 19th Street
- Applegate Street at 13th Street
- Applegate Street at 19th Street
- Highway 20/34 (Main Street) at 9th Street
- Highway 20/34 (Main Street) at 26th Street

Turning movement counts were performed at the first five intersections by City of Philomath personnel in April 1998. The manual turning movement count performed at the first intersection (US Highway 20 at OR Highway 34) was taken over a 12-hour period from 6:00 a.m. to 6:00 p.m. The next four intersections were observed during their PM peak period, which occurs between 3:00 p.m. and 6:00 p.m. The remaining two intersections were not

¹ *Benton County Transportation System Plan Draft Report*, published June 1998, Kittelson and Associates., Inc..

counted, but PM peak hour volumes at these intersections were estimated using the turning movement counts at adjacent intersections and the 1996 PM peak hour traffic volume estimates from the EMME/2 model. Detailed results of the operations analyses for all key intersections are located in Appendix E.

Signalized Intersections

Traffic operations at selected signalized intersections were analyzed using ODOT’s SIGCAP-2 software. SIGCAP-2 is a capacity analysis program designed to calculate the Level-of-Service, and the level of saturation, or volume-to-capacity ratio, for individual movements based on traffic demand. A technical summary of the methodology used to determine these factors is located in Appendix E.

Currently, there are only two signalized intersections in the Philomath area: Main Street at 13th Street, and Main Street at 19th Street. Table 4-1 displays the current operations at these intersections. Conditions are for the PM peak hour for an average weekday.

**TABLE 4-1
CURRENT LEVEL OF SERVICE AT
SIGNALIZED INTERSECTIONS**

Location	LOS
<i>Main Street (Hwy 20/34)</i>	
at 13th Street	B
at 19th Street	C

Overall, both signalized intersections currently operate at a LOS C or better, which is acceptable.

Unsignalized Intersections

The remaining five intersections are unsignalized. Current operations at these intersections were analyzed using ODOT’s UNSIG10 software. The level-of-service criteria used in this program for unsignalized intersections can be found in Appendix E. Table 4-2 displays the results of the analysis. LOS is shown for all critical movements.

**TABLE 4-2
CURRENT LEVEL OF SERVICE
AT SELECTED UNSIGNALIZED INTERSECTIONS**

Location	Critical Movement	LOS
Hwy 20 and Hwy 34	Northbound; Left	C
	Northbound; Right	A
	Westbound; Left	A
Main Street and 9th Street	Eastbound; Left	A
	Westbound; Left	A
	Southbound; All	D
	Northbound; All	D
Main Street and 26th Street	Westbound; Left	A
	Northbound; All	D
Applegate Street and 13th Street	All Movements	A
Applegate Street and 19th Street	All Movements	A

EXISTING SIGNAL WARRANTS

A concern has been raised about the necessity for additional traffic signals along Main Street (Highway 20/34) throughout the city, to improve access from intersecting side streets and to provide for pedestrian crossings. Inspection of current traffic volumes, intersection operations, and probable locations of new traffic signals indicates three likely locations: the intersection of US Highway 20 at OR Highway 34; Main Street at 9th Street; and, Main Street at 26th Street. Each of these intersections has the highest amount of traffic accessing Main Street (Highway 20/34) at unsignalized intersections. These intersections are also the most likely locations for future traffic signals since the traffic signals would be approximately equidistant from each other. This would allow for favorable traffic signal progression with two-way traffic along the highway. The spacing between signals would not be a determining factor for one-way street operations.

To determine where traffic signal warrants could be met at this time, a signal warrant analysis was performed at each intersection. This analysis was based on existing traffic count information.

The signal warrant analyses were performed using *The Manual on Uniform Traffic Control Devices, 1988* (MUTCD). The MUTCD states that "Traffic control signals should not be installed unless one or more of the signal warrants in this manual are met." ODOT typically only installs traffic signals when the Minimum Vehicular Volume Warrant, Interruption of Continuous Traffic Warrant or Accident Warrant is met. A detailed description of each signal warrant analysis is located in Appendix E.

Results from the analysis including which warrants were met, are summarized below in Table 4-3.

**TABLE 4-3
SIGNAL WARRANT ANALYSIS
AT SELECTED UNSIGNALIZED INTERSECTIONS**

Intersection Location	Warrants Satisfied
Hwy 20 at Hwy 34	11 - Peak Hour Volume
Main Street and 9th Street	11 - Peak Hour Volume
Main Street and 26th Street	None at this time.

EXISTING TRUCK ROUTES AND TRAFFIC

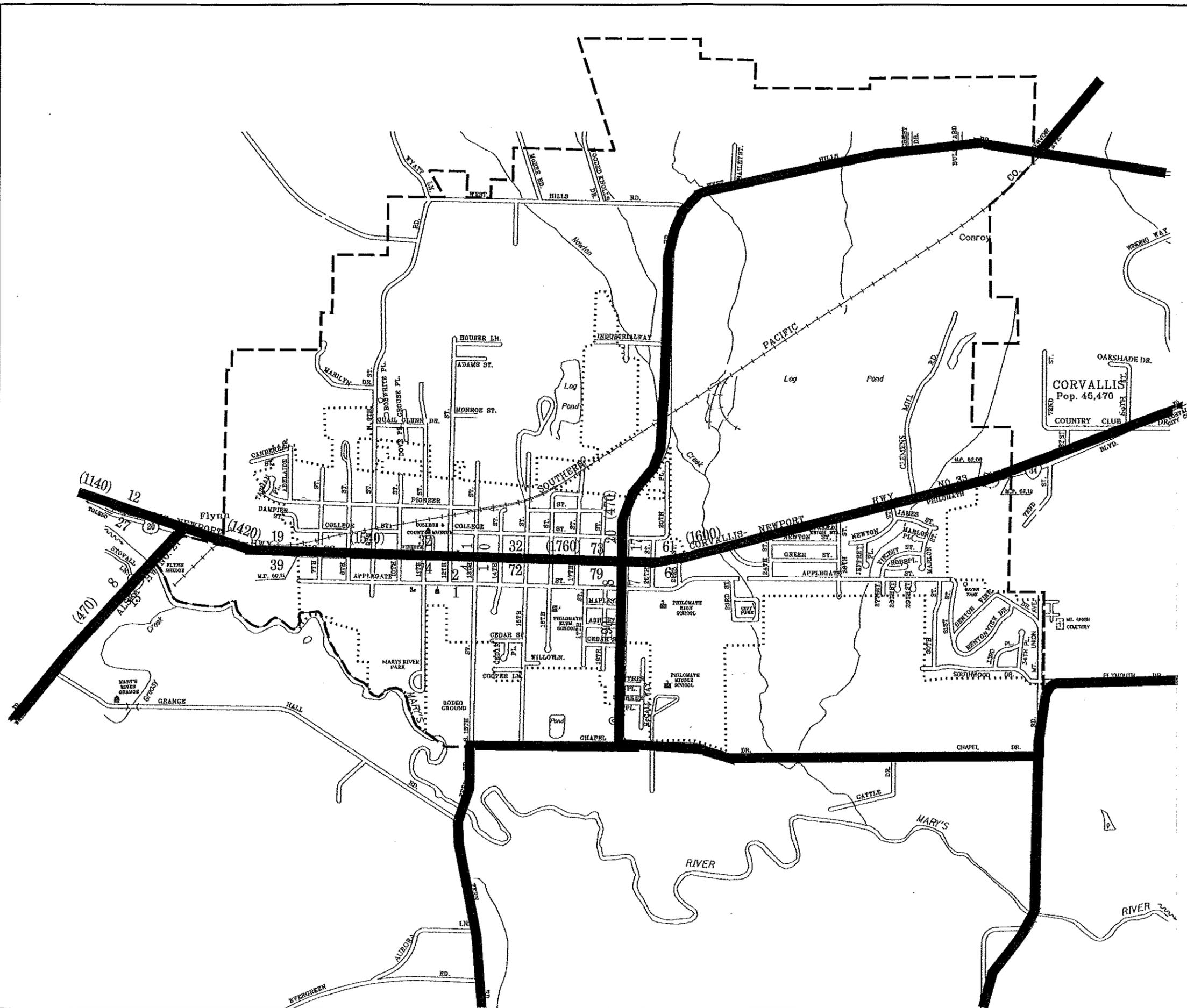
The main trucking route in the City of Philomath is along Highway 20/34 on Main Street. This route provides the most direct east-west connection between the larger cities of Corvallis and Albany to the east along Highway 20/34, and the coastal cities of Newport along Highway 20 and Waldport along Highway 34 to the west. Between 19th Street and the Alsea Highway west of town, Highway 20/34 is the only east-west connection for truck traffic in Philomath. There are other partial east-west truck routes that are less direct and less traveled than Highway 20/34. These routes include West Hills Road/Reservoir Road to North 19th Street providing access from the western portions of Corvallis, and Plymouth Drive/Bellfountain Road/Chapel Drive to South 19th Street from the southern portion of Corvallis and Albany (Pacific Highway to the southeast). East of Philomath in the city of Corvallis, the north-south road of 53rd Street intersects Reservoir Road, West Hills Road, Highway 20/34, and Plymouth Drive providing truckers with a choice of multiple routes.

Weight limits and other restrictions prevent truck traffic on several major roads in the Philomath area. They include:

- Grange Hall Road: Weight limits on the Greasy Creek Bridge prevent most trucks from using Grange Hall Road between the Alsea Highway and Fern Road. Weight limits are as follows: three-axle (24 tons), five-axle (37 tons), and six-axle (34 tons).
- 13th Street: A 12-ton weight limit exists on this road between Chapel Drive and Main Street.
- Applegate Street: A four-ton weight limit exists along most of this road.
- College Street: A four-ton weight limit exists along this road.
- 15th Street: This road is used by local truck traffic only and passes through a residential area between Chapel Drive and Main Street.
- 9th Street: North of Main Street, this road passes through a residential area and has a series of extreme horizontal and vertical curves making this route an unlikely route for trucks. Currently, there is a four-ton weight limit.

Figure 4-4 identifies the existing routes, not restricted by weight limits for trucks, in the Philomath area and the truck volumes on these routes. Truck volumes shown for the PM peak hour were obtained from turning movement counts performed at three key intersections along Highway 20/34, at the Alsea Highway, 13th Street, and 19th Street. Daily truck volumes shown in the figure were determined from the 12-hour count (6 a.m. to 6 p.m.) performed at the US Highway 20 and Alsea Highway intersection. Applying an adjustment factor of 1.25 to account for 24-hour truck traffic, it was determined that daily truck volumes represent approximately 11 percent of the overall ADT volumes. This factor was then applied to the ADT volumes along other sections of Highway 20/34 (Main Street) through town to obtain estimates for daily truck volumes.

ODOT0254/FIG4-4.DGN/TNT/08-20-98



(NOT TO SCALE)

LEGEND:

- U.G.B. LINE
- CITY LIMITS
- EXISTING TRUCK ROUTE
- (470) ADT
- 19 PM Peak Hour
- 39

FIGURE 4-4

Existing Truck Route System & Truck Volumes