3: Existing Conditions

Existing transportation conditions were evaluated as part of the City of Richland Transportation Plan. This chapter summarizes existing traffic and transportation operations in the City for all travel modes including pedestrians, bicycles, transit, motor vehicle, freight, water, air, and pipelines. In the spring of 2003, an inventory of traffic conditions in Richland was undertaken to conduct base year conditions analysis for the Transportation Plan. Much of this data provides a benchmark (basis of comparison) for future assessment of transportation performance in Richland relative to desired policies.

The city limits boundary comprises the study area, which is shown in Figure 3-1. Thirty-eight intersections within the study area were selected for evaluation to monitor motor vehicle performance on city streets. Traffic data was gathered at these locations and analyzed to evaluate area traffic conditions including volumes and levels of service.

In addition, City of Richland and regional transportation system inventories from Benton Franklin Council of Governments and Washington State Department of Transportation were used to map existing transportation facilities.

The following sections describe the existing systems, usage, and performance for travel modes in the City of Richland. Any deficiencies relative to performance standards or other issues to be considered in formulating transportation plan elements are noted within each section.

> 2003 Baseline Analysis for All Travel Modes
>
> **Pedestrian**
> **Bicycle**
> **Transit**
> **Motor Vehicle**
> **Marine**
> **Aviation**
> **Rail**
> **Pipeline**

System Performance Standards

The performance standards applied to the evaluation of Existing Conditions for the City of Richland were derived from existing city policy, and, where no policy applied, assumptions were made based on standards of professional transportation planning practice. These performance standards are the thresholds for determining acceptable versus unacceptable conditions in the transportation system. These standards and assumptions will be reviewed and modified, as appropriate, through later stages of the planning process.

Table 3-1: Transportation Performance Standards

Mode / Characteristic	Description	Adopted	Applied	Methodology or Other Comments
Motor Vehicle				
Intersection	Peak hour level of service: ▪ Minimum LOS D (traffic signal) ▪ Minimum LOS E (no signal)	■	■	Highway Capacity Manual, 2000, Chapters 16 and 17, based on average vehicle delay.
Corridor	Peak hour average travel speed (varies by facility type) ▪ LOS D minimum		■	Highway Capacity Manual, 2000, Chapter 15 & 29. Best applied to routes greater than one mile in length.
Vehicle Safety	Crash rate per million entering vehicles: Intersection: ▪ > 1.0 crashes/MEV		■	Based on crash data reported by the City of Richland.
Pedestrian				
System Connectivity	Continuity and proximity of sidewalk/trail system. Minimum standard: ▪ 1/4 mile from schools, parks, retail and other major pedestrian generators		■	Based on GIS data and field review for functional classes above local streets.
Crossing Spacing on Arterial Facilities	Minimum standard between adjacent crossing facilities ▪ 1/4-mile on arterials		■	Crossing control types, in descending order (grade-separated structure, pedestrian signal with crosswalks, uncontrolled crosswalk.
Bicycle				
System Connectivity	Same as Pedestrian		■	Based on GIS data and field review for functional classes above local streets.
Transit				
Bus Headway	Frequency of bus service during hours of operation. ▪ No minimum standard		■	Based on methods in Highway Capacity Manual, 2000, Chapter 27.
Service Coverage	Level of service rating for employment and housing densities above minimum required for transit service within 1/4 mile walking distance from bus stops. ▪ No minimum standard		■	Based on methods in Highway Capacity Manual, 2000, Chapter 27.

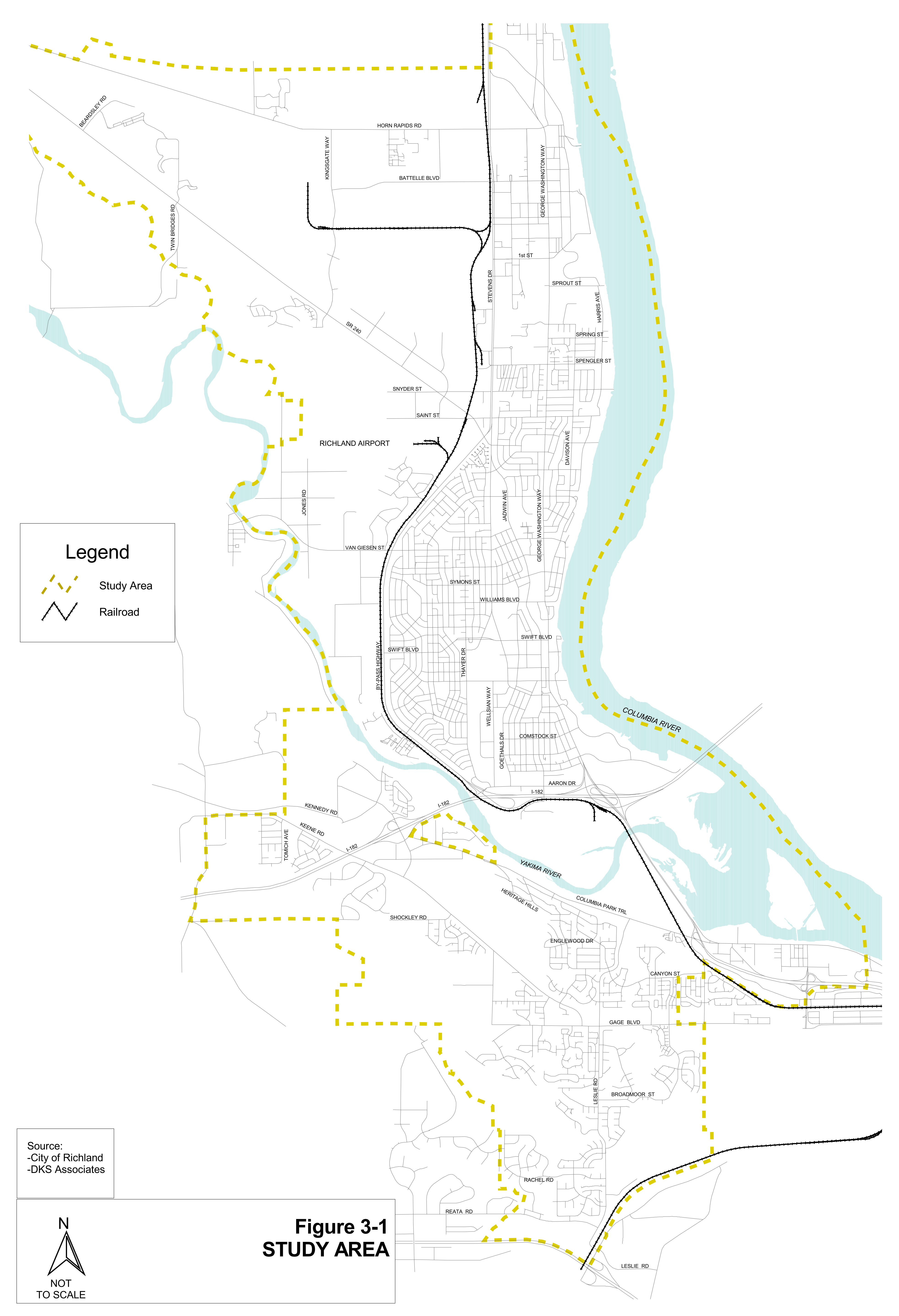


Figure 3-1
STUDY AREA

Level of Service Definition

Level of Service (LOS) is a phrase that describes measures of effectiveness for various transportation operations. The concept is similar to a "report card" rating based upon a quantitative value. For example, average vehicle delay is used to assess Level of Service for a given street intersection location. The most common application of Level of Service evaluations is at intersections, as it relates to motor vehicle operations. The following section highlights how LOS findings are applied at intersections with differing types of traffic controls.

Intersections Controlled by Traffic Signals

Level of Service A, B, and C indicate conditions where traffic moves without significant delays over periods of peak hour travel demand. Level of Service D and E are progressively worse peak hour operating conditions. For example, at an intersection controlled by a traffic signal, Level of Service F represents conditions where average vehicle delay exceeds 80 seconds per vehicle entering a signalized intersection and demand has exceeded capacity.

It is important to note that the Highway Capacity Manual (HCM) methodology for signalized intersection analysis treats each intersection as an isolated signal within a roadway system. Constraints to traffic flow at nearby intersections can influence operations, and the HCM reported LOS may not be representative of actual field conditions. In those cases, additional performance measures should be applied to better understand current operations. The best local example is the bottleneck approaching SR 240 from southbound George Washington Way. Vehicle queues during the weekday afternoon peak period on the freeway approach spillback onto the city streets. These queues and low speeds impact traffic operations at city intersections on George Washington Way at Columbia Point, to George Washington Way at Jadwin Avenue on a routine basis.

Intersections Without Traffic Signals

Unsignalized intersections provide levels of service for major and minor street turning movements. For this reason, LOS E and even LOS F can occur for a specific turning movement; however, the majority of traffic may not be delayed (in cases where major street traffic is not required to stop). LOS E or F conditions at unsignalized intersections generally provide a basis to study intersections further to determine availability of acceptable gaps, safety and traffic signal warrants. The currently adopted standards for evaluating level of service in the 2001 Regional Transportation Plan is LOS D, however many local agencies use LOS E for determining level of service standards at unsignalized intersections.

Pedestrians

Many arterial and collector streets in Richland have sidewalks on both sides of the street, according to street inventory data provided by the city and illustrated in Figure 3-2. There are some locations where sidewalks are not connected; however, connectivity and pedestrian linkages are generally adequate, in particular close to parks and schools. Table 3-2 shows the roadway miles of city streets that have sidewalks on one or both sides of the street (the great majority have sidewalks on both sides where sidewalks are built – see Figure 3-2).

Table 3-2: Summary of Road Miles with Sidewalks on One or Both Sides

Functional Class	Miles of Roadway	Miles of Roadway with Sidewalk	Percent Served by Sidewalks
Principal Arterial	19.2	6.7	35%
Minor Arterial	25.8	9.0	35%
Arterial Collector	11.1	1.2	11%
Neighborhood Collector	14.2	9.4	66%
Total	70.3	26.3	37%

Note: Streets maintained by state or county within the city limits are not included. Local streets have not been included in the sidewalk inventory (refer to Table 3-5 for more information).

In general, about one-third of the arterial and collector streets have sidewalks facilities. Local streets were not included in the pedestrian facility inventory. In addition, several off-street paths and trails support the sidewalk system (i.e. the trails along SR-240 and I-182 and the Columbia Park Trail).

Conditions Affecting Pedestrians with Disabilities

Federal regulations[1] affecting roadway facility designs were passed in 1990 that apply to all cities and county street design standards. The most prominent changes implemented for transportation facilities was the provision of 5' wide handicap ramps at crosswalks. The City of Richland is in the process of upgrading ramps built prior to 1991 to comply with these standards.

Observed Activity

Pedestrian crossing volumes at the study intersections were counted at the same time the PM peak hour motor vehicle turn movement counts were conducted. The pedestrian crossing volumes are shown in Figure 3-3. The most significant pedestrian movements occur near retail, recreational, and transit areas, including George Washington Way and Stevens Drive. Along major roadways such as George Washington Way and Stevens Drive, Jadwin Avenue and SR 240, pedestrian crossings are limited to locations with traffic signal controls due to high motor vehicle volumes and speeds.

Findings and Issues

- Approximately 37% of designated arterial and collector roadways within the city limits have sidewalks on one or both sides of the street.
- Approximately 63% of these same facilities have gaps in the pedestrian circulation system.
- Arterial collector designations have the lowest share of pedestrian facilities with 11%.
- On-street pedestrian facilities are notably absent in the business park area north of Spengler Street between Stevens Drive and George Washington Way. Many of these are private streets, and any pedestrian amenities are not included in the inventory data.

1 Americans with Disability Act, 1990.

- The highest observed pedestrian crossing volumes at the selected study intersections occurred near retail centers along George Washington Way at McMurray – 20 pedestrians in one hour during the weekday PM peak period.

The Transportation Plan should consider the following pedestrian issues:

- Providing additional crossings and connections to improve crossing spacing along arterials and collectors.
- Identifying in-fill sidewalk projects to increase the sidewalk coverage on arterial and collector streets.
- Additional multi-use path alignments to provide more connections between neighborhoods and complete the pedestrian grid system.
- On-going retro-fitting of intersection crosswalks to ensure a 5' wide minimum ramp so as to be ADA compliant.
- Upgrading the entire pedestrian network to meet current standard levels.

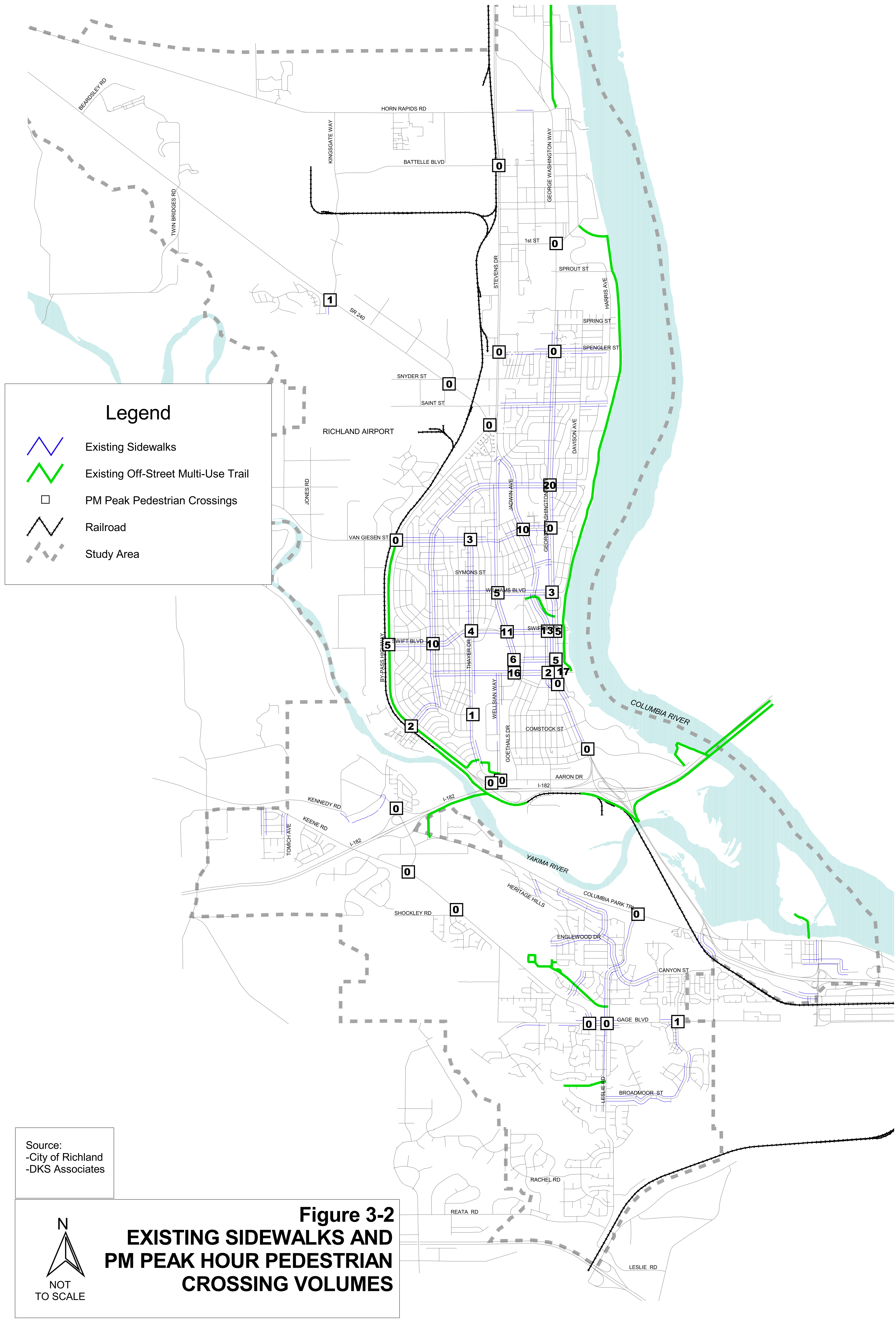


Figure 3-2
EXISTING SIDEWALKS AND PM PEAK HOUR PEDESTRIAN CROSSING VOLUMES

Bicycles

There are few designated on-street bike lanes within the City. One is on Swift Boulevard between Wright Avenue and Stevens Drive and the other is on Columbia Point between George Washington Way and its eastern terminus. There are also several multi-use paths – these can be used by both pedestrian and bicycle travelers. They are primarily located along the Columbia River, along I-182, and along SR 240. Figure 3-3 shows the existing bicycle facility inventory in Richland. The existing bike lane system on arterial and collector streets does not provide adequate connections from neighborhoods to schools, parks, retail centers, or transit stops. Local streets do not require dedicated bike facilities since the low motor vehicle volumes and speeds allow for both autos and bikes to share the roadway. Cyclists desiring to travel through the City generally either share the roadway with motor vehicles on major streets or find alternate routes on lower volume local streets.

Observed Activity

Bicycle counts were conducted during the evening peak period (4:00 to 6:00 PM) at the study intersections in Richland and are shown in Figure 3-3. The existing bicycle volumes are generally low and can be expected to increase in residential areas during the summer months. The highest observed location was George Washington Way at McMurray, which had six bicyclists over the two-hour period. Bike volumes are generally low compared to motor vehicles or pedestrian volumes. Bike volumes during mid-day and weekend hours would likely be higher than observed during the weekday afternoon peak period.

Arterial Accommodations for Cycling Commuters

On-street bike facilities are very limited within the city today. The existing bike facilities are associated with the off-street trail and pathway system noted above. These routes are generally more suitable for commute cyclists, because they tend to have longer trips lengths than casual bike trips. The two north-south trails parallel the west bank of the Columbia River between Columbia Point and the Batelle Business Park area, and the east side of SR 240 between Aaron Drive and Van Giesen Street. East-west connections to destinations and cross-routes between trails are very limited.

Safe Routes to School

Neighborhood bike facilities are generally not provided. Student riding bikes to and from schools typically share the roadway with motorists or travel on the sidewalks, where available.

Findings and Issues

Our review of the bicycle system showed that:

- On-street bike facilities are very limited on arterial and collector streets. Less than one percent of the city streets in these categories have on-street bike lanes. Cyclists generally must share the travel way with autos and trucks or ride on the sidewalks.
- The absence of bike facilities is most apparent for student cyclists to neighborhood schools.
- Off-street bike multi-use pathways provide connections along the large portions of the riverfront, SR 240 Bypass, I-182 and Keene Road.

- Observed bike volumes were generally typical for suburban communities during the weekday PM peak hours.
  - The transportation plan should identify arterial streets that should be improved to provide on-street bike facilities, where circulation connections are most critical.

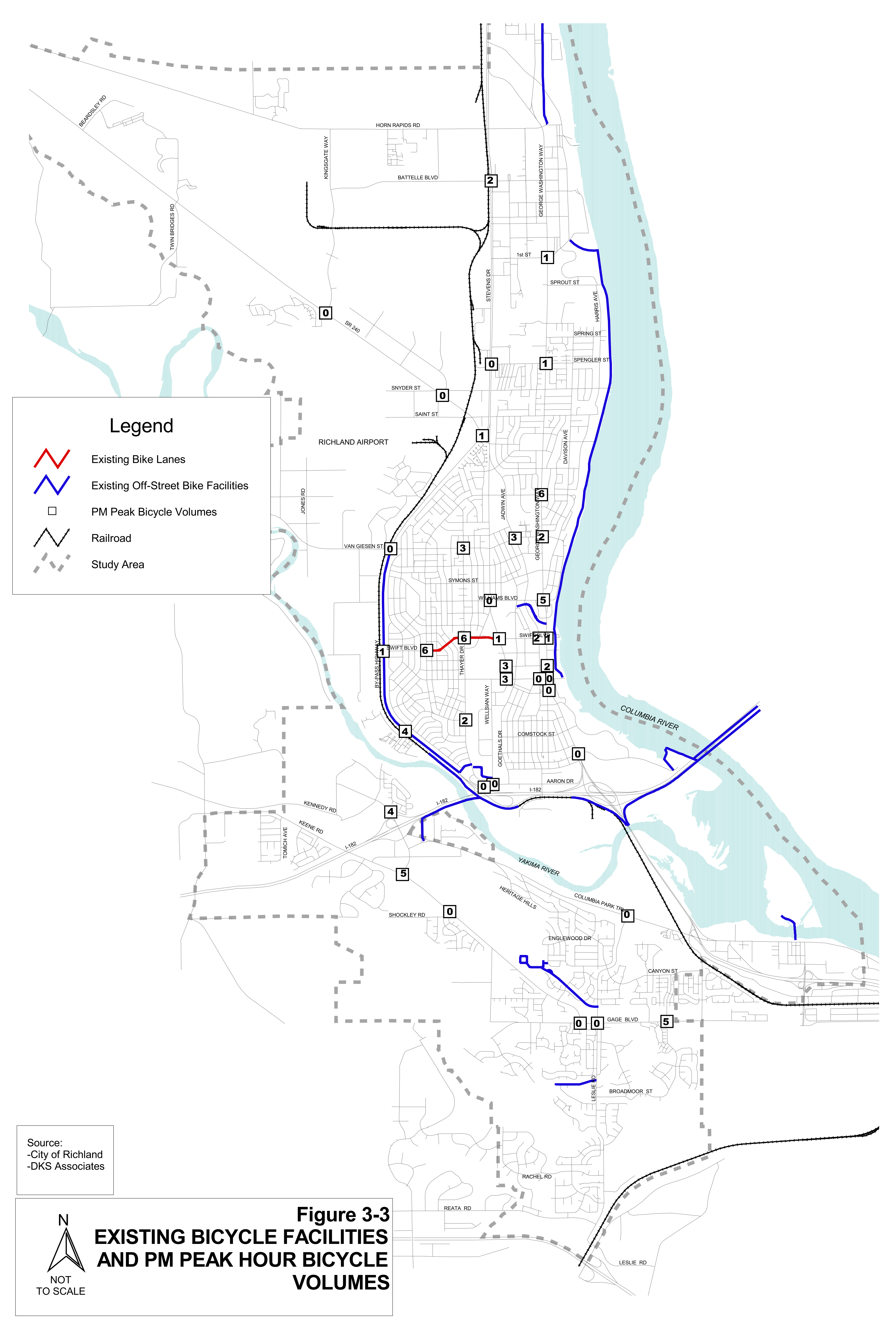


Figure 3-3
EXISTING BICYCLE FACILITIES AND PM PEAK HOUR BICYCLE VOLUMES

Transit

Transit service is provided to Richland by the Ben Franklin Transit District (BFT). Figure 3-4 shows current BFT bus routes serving Richland, including four inter city routes, five Richland locals (which do not leave Richland) and one West Richland local route. These routes connect origins and destinations within Richland as well as to neighboring communities, such as Kennewick, Pasco, West Richland, Prosser and Benton City. BFT provides service from 6:00 AM to 7:30 PM weekdays and from 8:00 AM to 7:00 PM on Saturdays. There is no Sunday transit service. A transit center is located on Knight Street between Goethals Drive and Northgate Drive that provides a park and ride lot with 33 spaces[2]. Dial-a-ride service is offered for people whose disabilities prevent them from utilizing the regular bus system.

Additionally, a taxi feeder service is available in areas not served by fixed route areas at no charge to the passenger. The taxi feeder service takes passengers to or from the nearest fixed route bus stop. This program is planned to be expanded to serve North Richland (including the WSU campus) and West Richland (along Keene Road and the retail development near the I-182 interchange at Queensgate Road). The hours of operation are similar to those of the fixed route service.

BFT also operates a vanpool system that includes a fleet of 103 vans, which is the largest such operation in the Pacific Northwest. A vanpool system is an effective transportation alternative for those with long commutes. Riders in BFT's 15-passenger vans share the cost of the van payment, fuel, maintenance, and insurance through a monthly fare. Vanpool drivers are fellow commuters, responsible for collecting the monthly fee and fueling the vehicle. In return the driver rides free. Typical rider fares vary from $45 to $55 per month depending on frequency and length of commute trip.

Table 3-3 lists the average routes headways and corresponding level of service (based on the Highway Capacity Manual methodology[3]) for each of the routes serving Richland. All transit routes operate at the same headway during all hours of service, which are two buses each hour. This is associated with Level of Service (LOS) D rating based only on bus headway.

Table 3-3: Ben Franklin Fixed-Route Transit Weekday Peak Period Level of Service

Fixed Service Routes Within Richland City Limits	Operation Period	Headway (Minutes)	Level of Service
10, 20, 23, 24, 26, 39, 120, 225	AM - 06:00 to 08:30	30	D
10, 20, 23, 24, 26, 39, 120, 225	Midday - 08:30 to 16:00	30	D
10, 20, 23, 24, 26, 39, 120, 225	PM - 16:00 to 18:00	30	D

Level of Service (LOS) for transit service based on headway: less than 10 minutes = LOS A; 10-14 minutes = LOS B; 14-19 minutes = LOS C; 20-29 minutes = LOS D; 30-60 minutes = LOS E; and greater than 60 minutes = LOS F.

[2] *Regional Transportation Plan*, Benton Franklin Council of Governments, November 2001, Page 4-27.

[3] *2000 Highway Capacity Manual*, Transportation Research Board, 2000, Chapter 27.

Observed Activity

Bus boarding information was received from Ben Franklin Transit for the month of April 2002 and year to date. Referring to Table 3-4, the average weekday bus ridership was 1,500 on all Richland routes at the time of the survey. Monthly ridership totals by route ranged from a few hundred for special purpose routes up to 7,900 transit riders. The estimated annual transit ridership for the system is 385,000.

Table 3-4: Ben Franklin Transit Ridership (based on surveys taken 4/30/02)

Route	Run	Month of 04/30/02	Year to Date (4/30/02)	Annual Estimate
Wright-KTC*	201	7,883	28,764	86,300
Snyder-KTC	231,232	4,683	19,337	58,000
KTC-WPPSS	261	6,819	28,328	85,000
KTC-KTC (24 & 26)	241,242	5,226	21,072	63,200
Liberty-Christian Trippers	203,204,205,206,2011,2014	-	870	2,600
West Side Baptist Trippers	208,209,210,2013,2015,2016	827	2,665	8,000
Hanford Trippers	26-4-5-6-7-23-30-32-31,266	6,120	26,500	79,500
Jefferson Trippers	26-8-9-21-22	-	816	2,450
Subtotal Richland		31,558	128,352	385,050

Source: Ed Frost, Ben Franklin Transit District, 5/23/03 email. Annual estimates by DKS Associates.
*KTC = Knight Transit Center

A more complete assessment of transit level of service can be determined based on area of coverage and route reliability (see Chapter 7). The transit coverage analysis compares land that has a high enough density to support transit service within a 1/4-mile walking distance buffer around transit stops.

Findings and Issues

Our review of the transit service in Richland shows that:

- Transit routes in Central Richland generally cover most of the major streets, and operate at 30-minute headways.
- Fixed route bus service does not circulate through most of southwest portion of the city – generally west of Leslie Road and south of Interstate 182.
- Fixed route bus service does not circulate through the North Richland office park area, north of the WSU campus, where the existing routes terminate.
- Additional service may be considered during commute hours, especially on routes serving major employment sites such as North Richland office park area and the Horn Rapids Industrial area (in the future).
- Currently, areas not served by fixed-route bus service are generally served by the taxi feeder program, which takes riders to the nearest bus stop free of charge.
- Additional transit performance data is needed to more comprehensively report existing service levels. Additional analysis can be performed for transit coverage based on land use density for supportive minimum transit services (see Chapter 7).

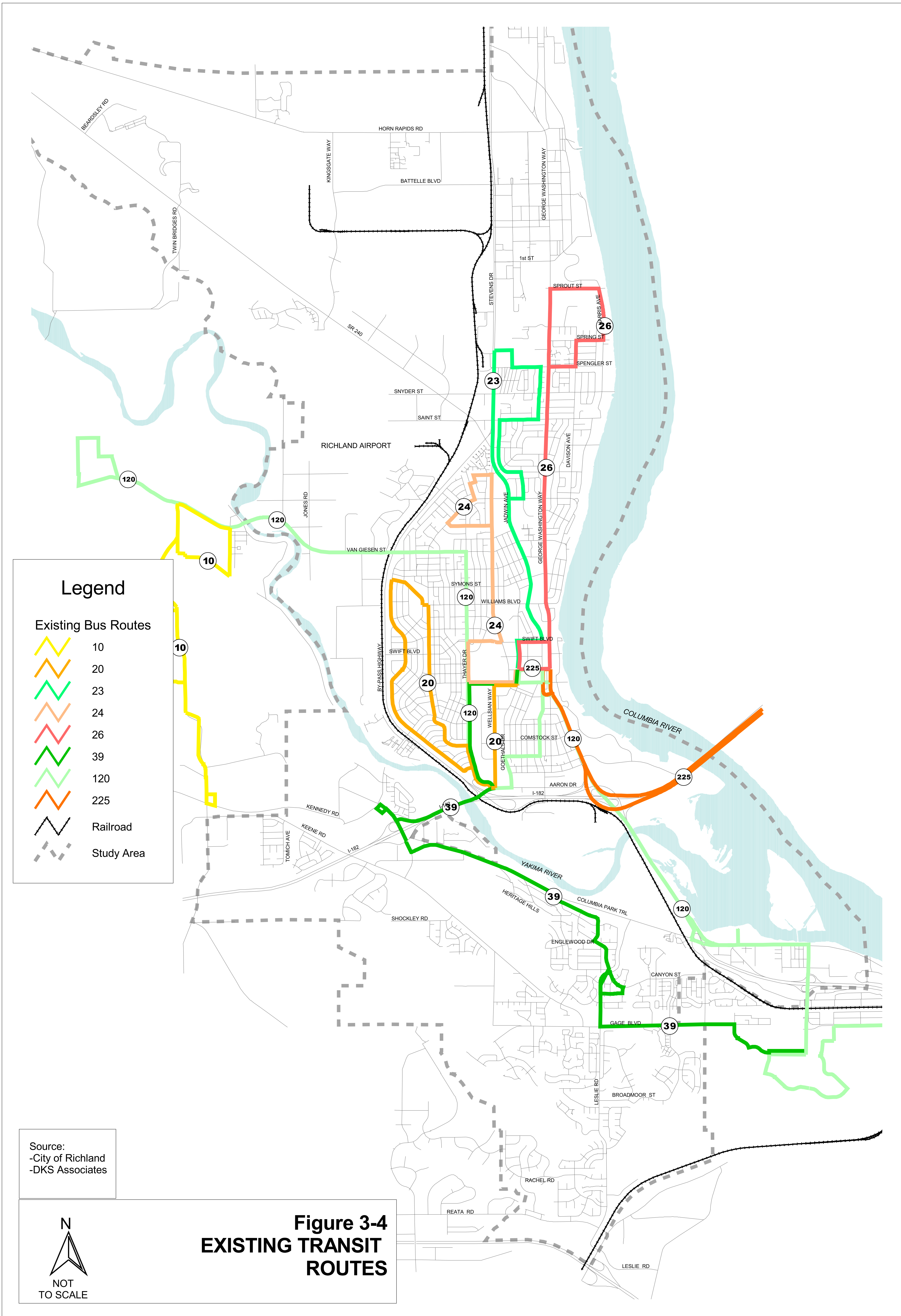
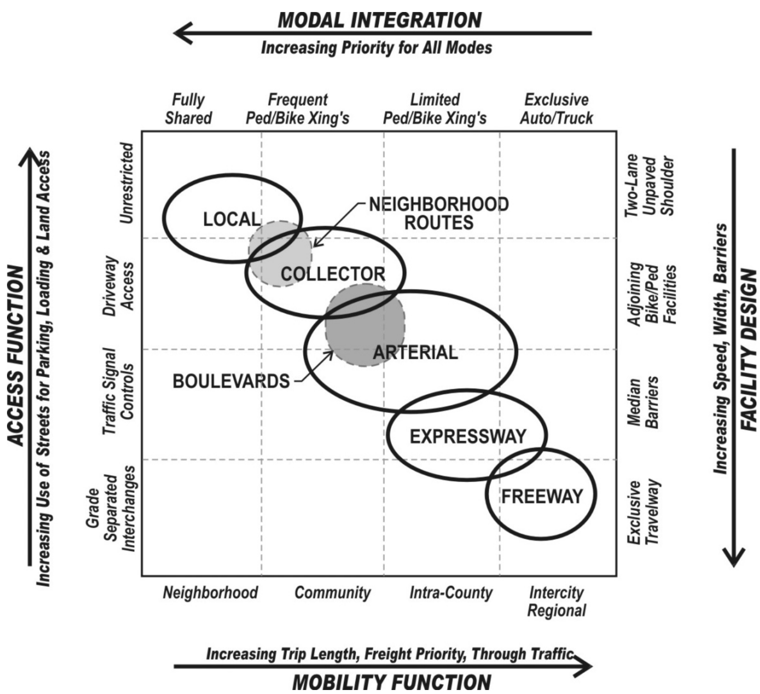


Figure 3-4
EXISTING TRANSIT ROUTES

Motor Vehicle

Street Functional Classification

The functional classification system is designed to serve transport needs within the community. The schematic diagram on the following page illustrates the competing functional nature of roadway facilities as it relates to access, mobility, multi-modal transport, and facility design. The diagram is useful to understand how worthwhile objectives can have opposing effects. For example, as mobility is increased (bottom axis), the provision for non-motor vehicle modes (top axis) is decreased accordingly. Similarly, as access increases (left axis), the facility design (right axis) dictates slower speeds, narrower travelways, and non-exclusive facilities. The goal of selecting functional classes for particular roadways is to provide a suitable balance of these four competing objectives.



The diagram shows that as street classes progress from local to collector to arterial to freeway (top left corner to bottom right corner) the following occurs:

- Mobility Increases – Longer trips between destinations, greater proportion of freight traffic movement, and a higher proportion of through traffic.
- Integration of Pedestrian and Bicycle Decreases – Provisions for adjoining sidewalks and bike facilities are required up through the arterial class, however, the frequency of intersection or mid-block crossings for non-motorized vehicles steadily decreases with higher functional classes. The expressway and freeway facilities typically do not allow pedestrian and bike facilities adjacent to the roadway and any crossings are grade-separated to enhance mobility and safety.
- Access Decreases– The shared uses for parking, loading, and direct land access is reduced. This occurs through parking regulation, access control and spacing standards (see opposite axis).
- Facility Design Standards Increase – Roadway design standards require increasingly wider, faster facilities leading to exclusive travelways for autos and trucks only. The opposite end of the scale is the most basic two-lane roadway with unpaved shoulders

Two additional areas are noted on the diagram for Neighborhood Routes and Boulevards that span two conventional street classes. The city does not use these designations at this stage. There is a designation for Neighborhood Collector, which appears to be similar to a

Neighborhood Route, but not a specific designation for Boulevard.

Findings and Observations

The existing Richland functional class system for roadway facilities is shown in Figure 3-5. The existing Richland functional classification is discontinuous along some roadways, with some arterials changing classification within the City or arterials ending at a non-classified street. Several observations were made about the existing street designations:

- Williams Boulevard functional class changes several times in a short distance -- from neighborhood collector to local to arterial collector. A uniform designation should be considered.
- There are no functional class designations higher than local streets east of George Washington Way. Several of the residential neighborhoods have long, connecting streets that might be considered for a higher functionality including Davison Avenue and Harris Avenue.
- Arterial Collector is a potentially confusing name that is inconsistent with the Regional Transportation Plan categories. The city should consider an alternative naming convention.
- A functional class system based primarily on connectivity would enable Richland to provide mobility and access throughout the City.
- The arterial street classes were compared between available city designations and those shown in the Regional Transportation Plan. All streets appeared to have identical classifications between the two agencies. It was noted that the lesser classification names (arterial collector, neighborhood collector) did not conform to the region naming convention (Urban collector).
- The roadway miles by functional class were tallied for street owned by the city within their boundaries. The totals in Table 3-5 show that 81% of the streets within the city are local streets, and the higher classifications compose the remaining 19% with the higher proportion belonging to the Minor Arterial category. These values do not include streets owned by the state or the county, but they do include private streets (all private streets are local class).

Table 3-5: Summary of Road Miles within City by Street Functional Classification

Functional Class	Miles of Existing Roadway	Percent of Total City Street System
Interstate Highways	4	1%
State Highways	12	3%
Principal Arterial	19	4%
Minor Arterial	26	7%
Arterial Collector	11	3%
Neighborhood Collector	14	4%
Local (Public and Private)	304	78%
Total	390	100%

Note: Road mileage taken from GIS data provided by the City of Richland.

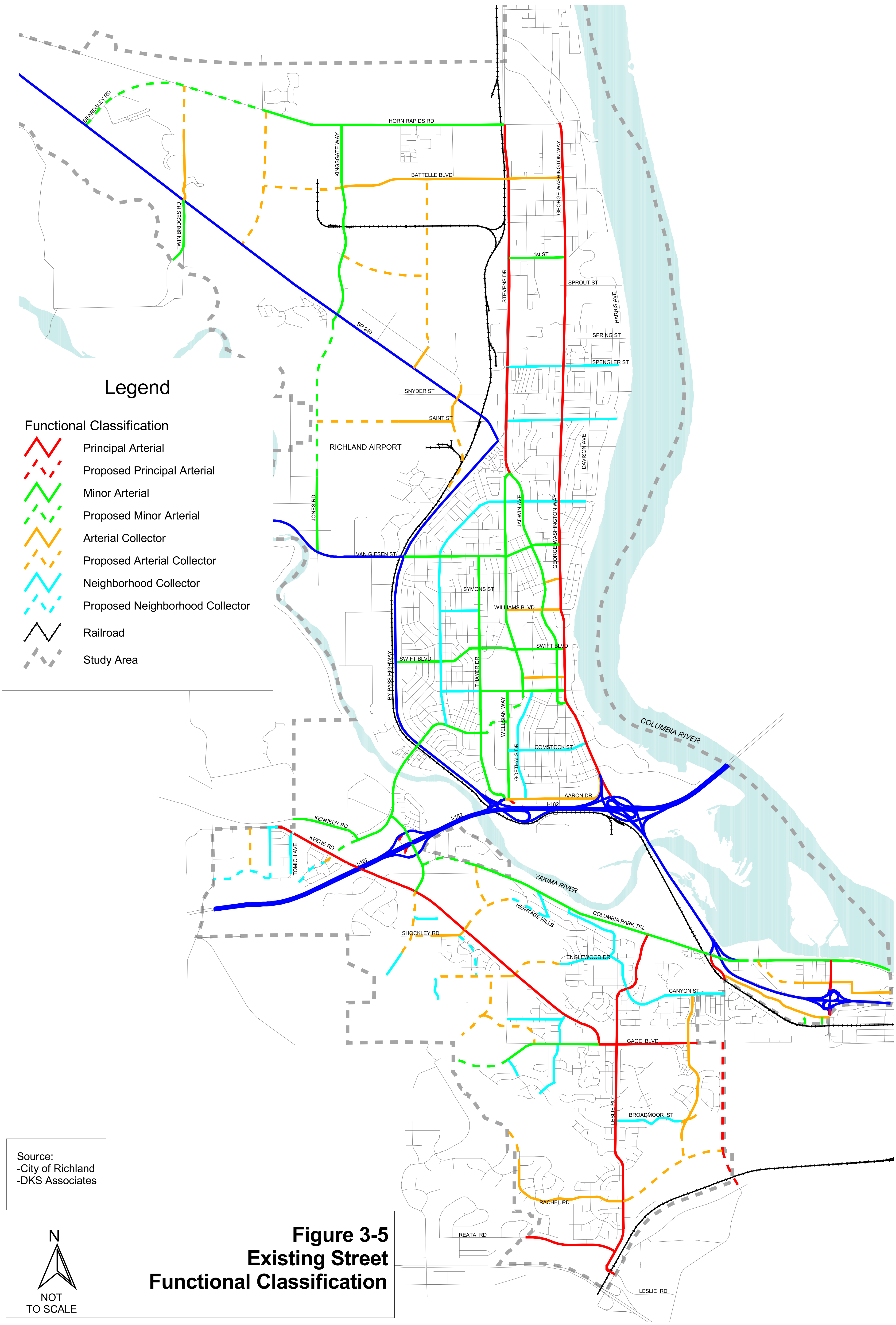


Figure 3-5
Existing Street Functional Classification

Roadway Physical Characteristics

Field inventories were conducted to determine characteristics of major roadways in the Transportation Plan study area. Data collected included posted speed limits, number of roadway lanes, and intersection controls. These characteristics define roadway capacity and operating speeds through the street system, and in turn affect travel path choices for drivers in Richland.

Posted Speed Limits

Figure 3-6 shows an inventory of the posted speeds in Richland. The majority of roadways in Richland are posted at 25 miles per hour (mph). All local streets are designated 25 mph unless they are posted differently. Arterial roadways such as SR 240, George Washington Way, Stevens Drive and Keene Road are posted at higher speeds ranging from 35 to 55 mph. Collector roadways such as Battelle Boulevard, Aaron Drive and Williams Boulevard are typically posted at 30 to 40 mph.

Number of Travel Lanes

Figure 3-7 shows the existing number of lanes on each roadway in Richland. The widest city roadway is George Washington Way, which is generally 5-lanes south of Spengler Street and four lanes to the north. Three-lane roadways are uncommon within the city, and were noted only on Leslie Road and portions of Gage Boulevard. State facilities have more lane capacity, notably the 7-lane SR 240 Bypass that parallels George Washington Way on the west side of Richland north of I-182.

Type of Intersection Controls

Figure 3-8 shows the existing intersection traffic signal controls at the study intersections. Traffic signals exist mainly along George Washington Way, SR 240, Stevens Drive (several under construction north of Snyder Street), Jadwin Avenue, Swift Boulevard and Van Giesen. 2-way or all-way stop signs control most other intersections not mentioned above. The exception is on Lee Boulevard at the Parkway, where a traffic circle has been installed to calm and control traffic flow.

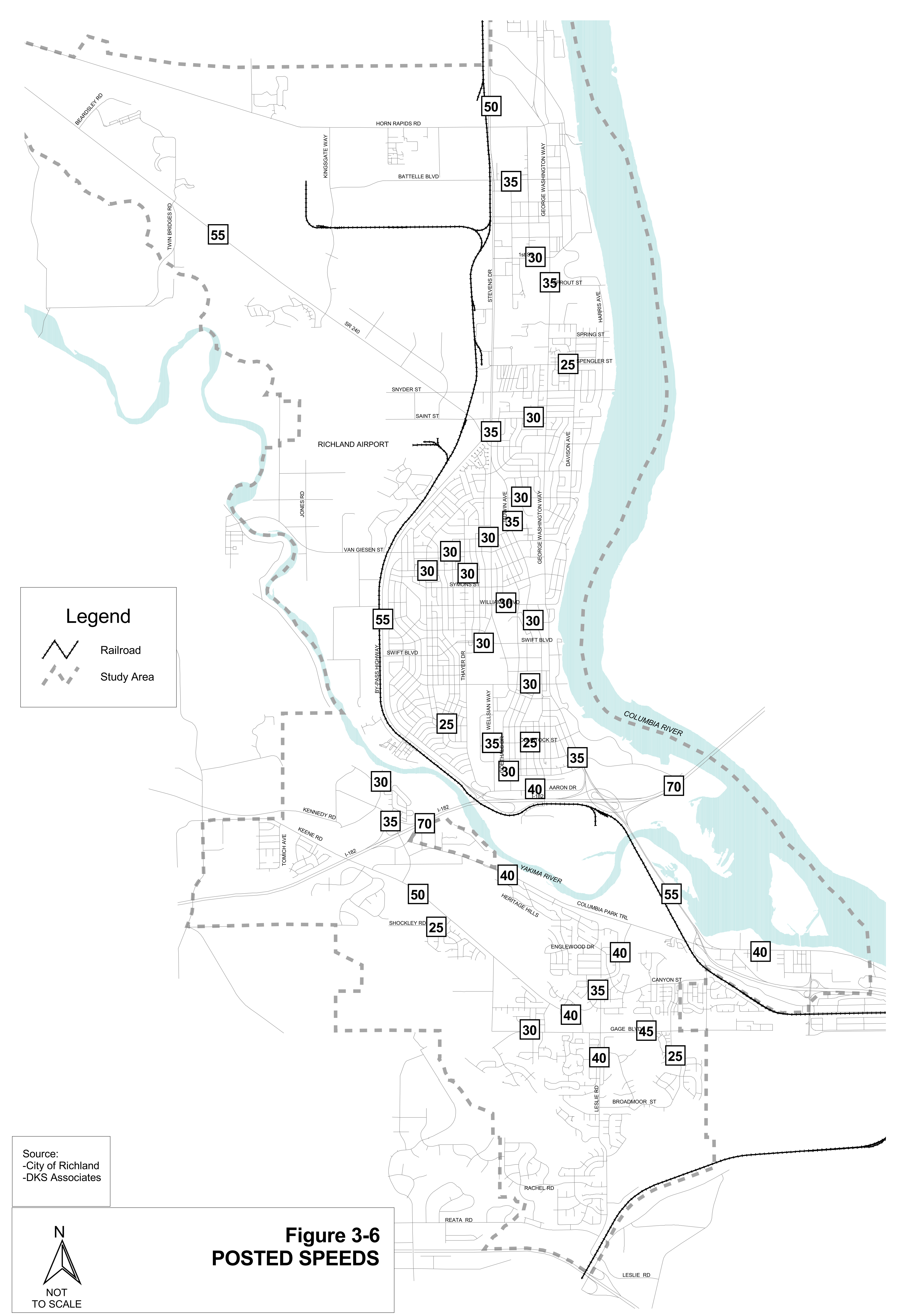


Figure 3-6
POSTED SPEEDS

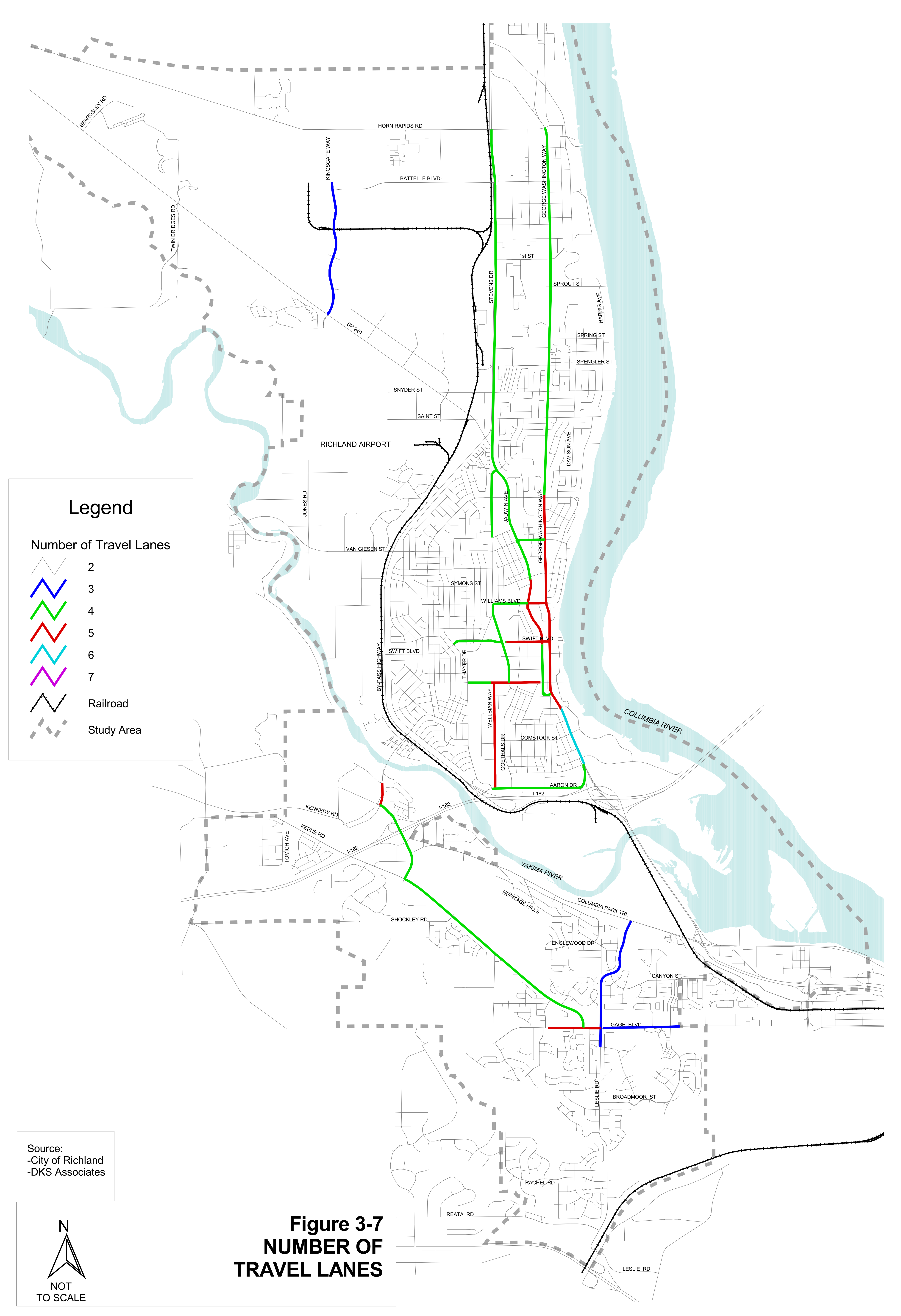
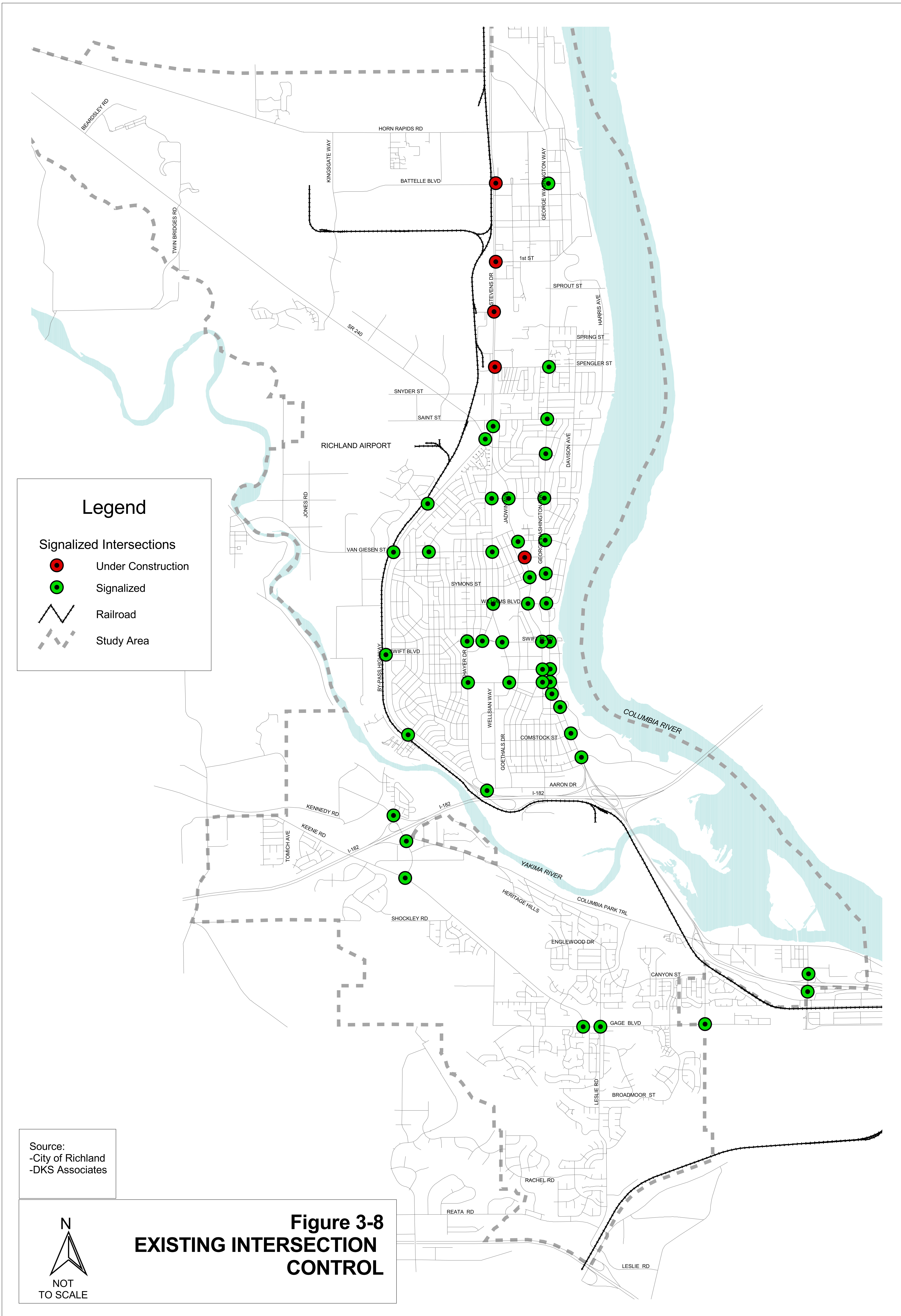


Figure 3-7
NUMBER OF TRAVEL LANES

DKS *Associates*
TRANSPORTATION SOLUTIONS

City of Richland
Transportation Plan



Source:
-City of Richland
-DKS Associates

Figure 3-8
EXISTING INTERSECTION CONTROL

Observed Activity

Turn movement counts were conducted at 38 intersections during the evening (4-6 PM) peak period. Study intersections were chosen in coordination with the City of Richland staff in order to address the City's major roadways and noted areas of concern. Figure 3-9 shows the two-way existing traffic volumes on streets in the Richland area. These two-way traffic volumes can vary from day to day and month-to-month based on weather, surrounding roadway conditions, and holidays.

Construction Effects on Traffic Observations

These counts were conducted during construction closures on Jadwin Avenue between Van Giesen Street and Stevens Drive. A comparison was made of historical traffic counts before the construction to assess the degree of traffic diversions reflected in the current traffic counts. It was determined that north-south volumes on the parallel arterials to Jadwin Avenue (George Washington Way and SR 240 Bypass) carried similar peak hour volumes for both periods. The changes in traffic volumes were localized to the immediate area of the construction. No adjustments to the 2003 count traffic volumes were made.

Table 3-6: Two-Way Peak Hour Volumes at Selected Locations

Street	Limits	Two-Way Total Volume
George Washington Way	North of Spengler Street.	1,600
	North of Swift Blvd.	2,300
	North of Columbia Point	2,750
Stevens Drive	North of Battelle Blvd.	1,500
	North of Snyder St.	2,750
Keene Road	South of Queensgate	1,300
Gage Boulevard	East of Leslie Road	1,100
SR 240 Bypass	North of Airport Road	3,050
	North of I-182	4,150
Van Giesen Street	West of SR 240 Bypass	1,750
	East of SR 240 Bypass	1,150
	East of Jadwin Avenue	800
Lee Boulevard	East of Wellsian Way	1,250
I-182 (SR 240)	East of SR 240 Bypass	5,700

Source: Traffic counts taken April 2003, and WSDOT data reported for 2002.

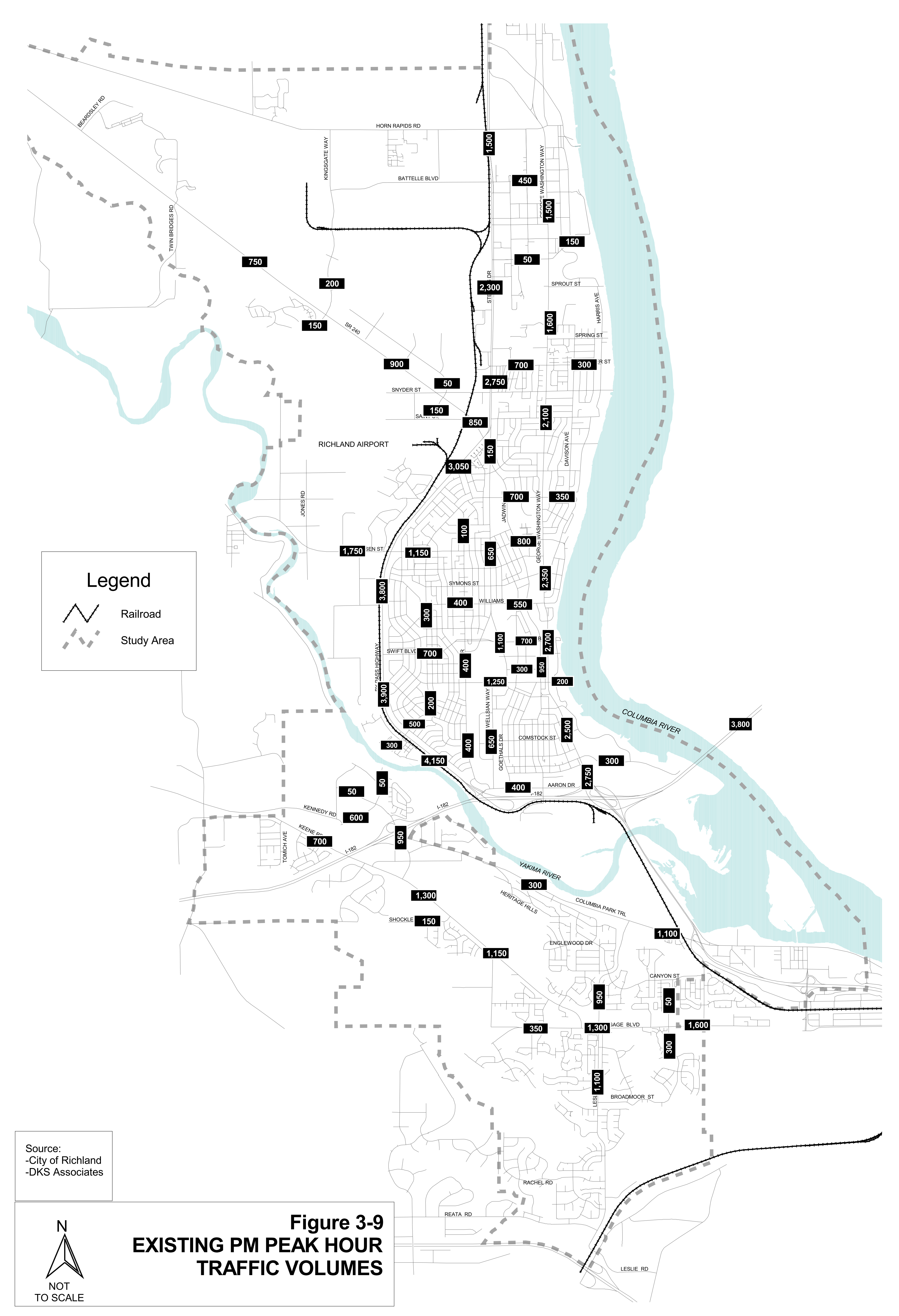


Figure 3-9
EXISTING PM PEAK HOUR TRAFFIC VOLUMES

Findings and Issues

Traffic Levels of Service

The intersection turn movement counts conducted during the afternoon peak periods were used to determine the 2003 LOS based on the 2000 Highway Capacity Manual methodology for signalized and unsignalized intersections[4]. Traffic counts and level of service calculation sheets can be found in the appendix. Table 3-7 (traffic signals) and Table 3-8 (unsignalized) list the existing PM peak hour intersection operation at the 38 study intersections. Reviewing the LOS results, each of the study intersections controlled by traffic signals operates at a LOS of D or better, based on traffic counts. Several of the unsignalized locations have long delays (LOS E or LOS F) for minor street approaches. Figure 3-10 shows a summary of the study intersection operating conditions.

Downstream Effects of Queues at Freeway Approaches

As noted previously, the spillback effects of queues approaching the I-182 & SR 240 freeways impacts arterials within the city. The findings noted for study intersections along George Washington Way and SR 240 Bypass near the freeway junctions was reviewed in the field to better understand actual traffic operations.

Vehicle queues extending north to Jadwin Avenue were common on George Washington Way during the afternoon peak period. The effect of these queues is to reduce the total volume of vehicles that pass through the intersection in one hour. The peak hour volume southbound on George Washington Way south of Columbia Point was 2,160 vehicles during the 4/30/03 traffic count. About two-thirds of this volume, perhaps 1,400 to 1,500 vehicles, continues straight through onto SR 240 southbound toward Kennewick, and the remainder takes the westbound ramp to I-182 towards Yakima or Pasco. The vehicle queues demonstrate that the observed volume is close to capacity of the existing facility – roughly 1,800 vehicles per lane. This artificial reduction in volumes through this intersection makes the LOS look better (as reflected in Table 3-7) but the actual condition is at capacity. Once the bottleneck located on the SR 240 causeway is improved, the observed hourly volumes at upstream city intersections will likely increase.

Table 3-7: Existing PM Peak Hour Intersection Level of Service (Traffic Signals)

Intersection	Level of Service	Average Delay (seconds)	Volume / Capacity
Duportail/Queensgate	B	17.2	0.32
George Washington/Adams/Columbia Pt. *	D (F)	43.5	1.00
George Washington/Knight	B	15.2	0.77
George Washington/Williams	A	6.1	0.61
George Washington/McMurray	B	16.5	0.87
George Washington/Spengler	B	19.2	0.86
George Washington/Jadwin *	B	17.4	0.73
George Washington/Lee	A	9.3	0.68

[4] *2000 Highway Capacity Manual*, Transportation Research Board, 2000.

Intersection	Level of Service	Average Delay (seconds)	Volume / Capacity
George Washington/Swift	C	30.9	0.76
George Washington/Van Giesen	B	15.0	0.85
I-82 WB/Thayer/Aaron*	B	12.2	0.63
Jadwin/Lee	B	18.7	0.58
Jadwin/Swift	B	14.6	0.45
Jadwin/Van Giesen (under construction)	B	18.1	0.49
Keene/Gage	B	15.8	0.56
Queensgate/Keene	C	24.5	0.84
Leslie/Gage	C	24.0	0.60
SR 240/Swift	B	17.1	0.88
SR 240/Van Giesen	D	50.4	0.95
SR 240/Stevens	C	33.6	0.94
SR 240/Duportail *	C	24.4	0.92
Stevens/Lee	C	23.1	0.63
Stevens/Swift	B	13.7	0.39
Stevens/Williams	B	15.6	0.55
Thayer/Swift	B	14.6	0.37

Note: * Locations influenced by downstream traffic queues. Reported LOS likely understates actual conditions.
Signalized and All-Way Stop Intersection LOS:

LOS = Level of Service

Delay = Average vehicle delay in the peak hour for entire intersection

V/C = Volume to Capacity Ratio

Table 3-8: Existing PM Peak Hour Intersection Conditions (Non-Signals)

Intersection	Most Delayed Major Street LOS	Most Delayed Minor Street LOS
Gage Blvd/Bellerive Rd	A	F
George Washington/First	A	F
Keene/Shockley	A	C
Leslie/Columbia Pkwy	B	F
SR 240/Hagen/Robertson	A	E
SR 240/Kingsgate	A	F
Stevens/Spengler	A	F
Stevens/Battelle	A	F
Stevens/Knight	A	C
Swift/Wright	A	F
Thayer/Duportail	A	B
Thayer/Van Giesen	A	F
Wellsian/Aaron	B	F

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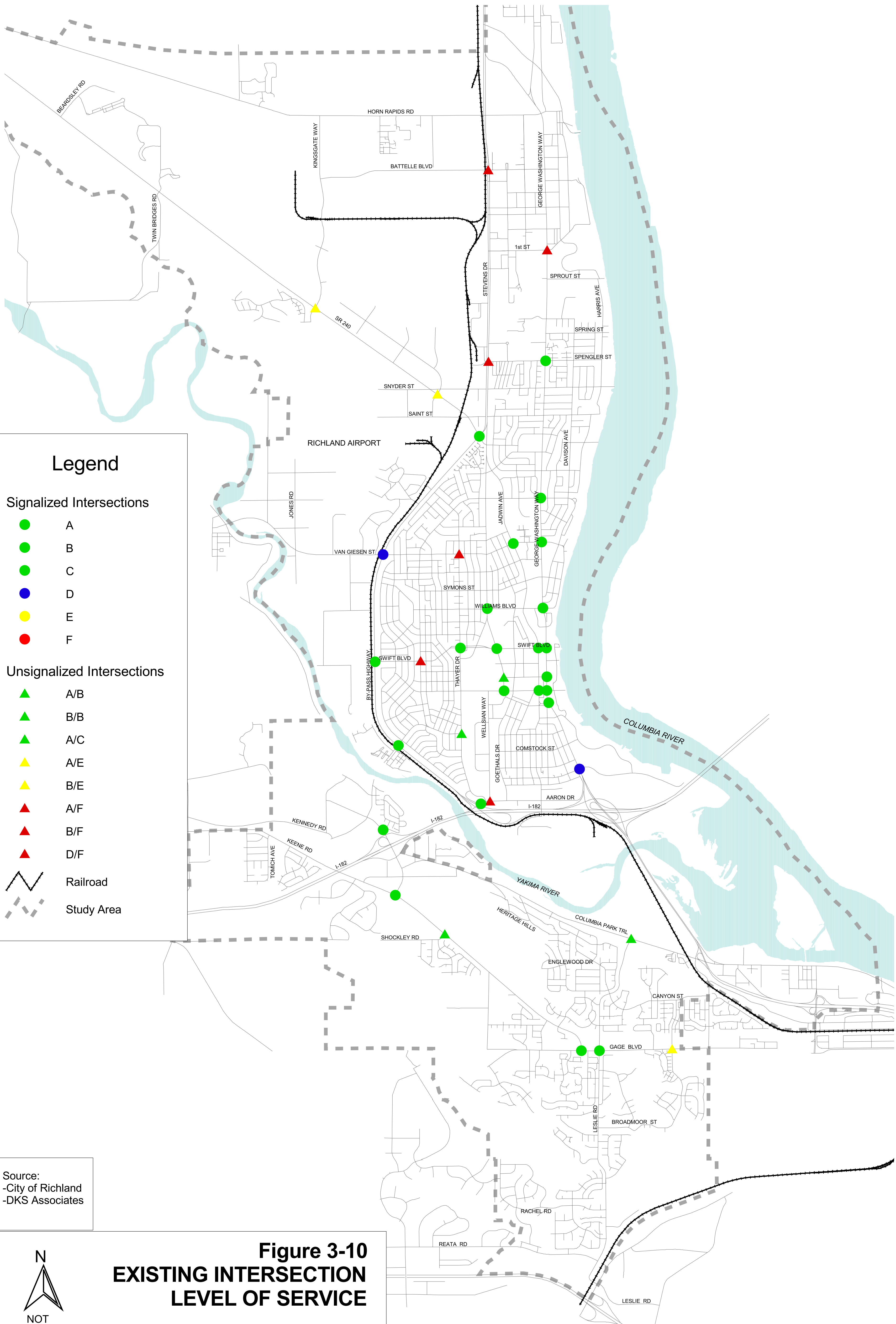

Legend

Signalized Intersections

- A
- B
- C
- D
- E
- F

Unsignalized Intersections

- A/B
- B/B
- A/C
- A/E
- B/E
- A/F
- B/F
- D/F
- Railroad
- Study Area

Source:
-City of Richland
-DKS Associates

N
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Figure 3-10
EXISTING INTERSECTION LEVEL OF SERVICE

Corridor Operations

George Washington Way and SR 240 (the Bypass) represent the two primary north-south corridors on either side of central Richland. The operations of these corridors are critical to the overall circulation and performance of the rest of the motor vehicle system north of I-182, especially during the peak weekday commute hours. To assess the overall operations of these corridors, a series of traffic surveys and travel model analyses were conducted to better understand the existing corridor characteristics.

Travel Time Surveys

Surveys were collected during a typical weekday PM peak period for vehicles traveling in the southbound direction between Van Giesen Boulevard and Interstate 182. The surveys were not conducted on a Friday, to avoid samples during a flexible work off day for many Hanford Reservation employees.

Table 3-3 lists the average travel speeds measured during the travel time runs. Overall travel time using SR 240 Bypass was significantly less than either routes on George Washington Way or Jadwin Avenue. The travel average time between Saint Street and I-182 on SR 240 (6.7 minutes) was about half the time required on George Washington Way or Jadwin Avenue (12.1 to 13.3 minutes). The speeds on the last mile between Jadwin Avenue and I-182 dropped to 12 miles per hour on average. Note that these values represent average times and speeds. It is likely that longer travel times and slower speeds do occur in this corridor during portions of the peak period.

As listed in the table, the average travel speeds indicate that George Washington Way can be associated with a Level of Service rating, based on the Urban Streets methods reported in the *Highway Capacity Manual*. The Level of Service rating is listed in Table 3-9 for each surveyed roadway segment. They range from LOS B in the north sections of GWW and Jadwin Avenue to LOS E in the southern sections of GWW approaching I-182 and SR 240. Conversely, SR 240 has lower LOS in the north section, and higher in the southern section approaching I-182.

Table 3-9: Existing North-South Corridor Characteristics, Southbound in PM Peak Period

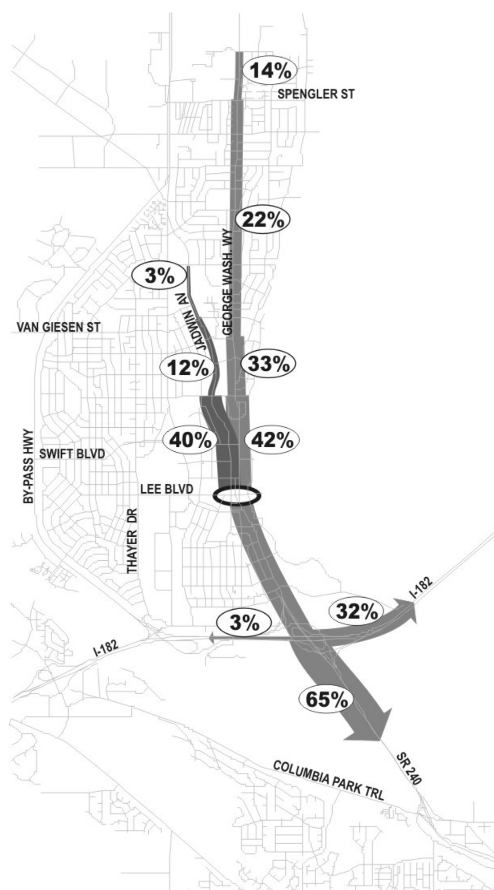
Route	Route Length (Miles)	Average Speed (MPH)	Average Time (Minutes)	Arterial Level of Service
George Washington Way				
Saint Street to Van Giesen Street	1.2	29.3	2.4	B
Van Giesen Street to Lee Boulevard	1.3	23.6	3.4	C
Lee Boulevard to I-182	1.2	11.7	6.3	E
			12.1	
Jadwin Avenue				
Saint Street to Van Giesen Street	1.2	30.2	2.2	A
Van Giesen Street to Lee Boulevard	1.4	26.0	3.2	B
Lee Boulevard to GWW	0.2	6.1	1.6	F
			7.0 (1)	
SR 240 – Stevens Drive				
Saint Street to Van Giesen Street	1.6	31.4	3.1	C
Van Giesen Street to Duportail Street	1.8	48.3	2.3	A
Duportail Street to I-182	0.9	41.7	1.3	B
			6.7	

Notes: Field surveys taken on 08/06/03 between the hours of 3:30 PM and 6:00 PM. Arterial LOS based on Table 15-2 in the Highway Capacity Manual, Chapter 15, 2000.

1. Additional travel time from Jadwin Avenue intersection with GWW to I-182 and SR-240 estimated at 5 to 6 minutes. Total time using Jadwin Avenue corridor to I-182 is 13 minutes.

<ins>George Washington Way Users</ins>

Past studies have noted that the regional north-south commutes associated with the Hanford Reservation site and the North Richland Business Park employers contributed substantially to the peak period congestion on the south end of George Washington Way. Field (GWW) observations were made on George Washington Way at four stations to track vehicle make, model and color between the hours of 4:00 to 6:00 PM on August 5, 2003, and a separate analysis was made using the BFCG travel demand model to test these assumptions.



Contrary to popular beliefs, we found that most of the traffic on Jadwin Avenue or George Washington Way in the north half of the city does not continue through to I-182 during peak hours. Table 3-10 shows the percent of traffic at various locations that also use George Washington Way south of Columbia Point during the afternoon peak hour (also illustrated in diagram at right). For example, 14 percent of the GWW traffic observed at Spengler Street continues over three miles through town to enter

I-182 or SR 240. Moving down the table, the percentages are reported for GWW and Jadwin Avenue at various cross streets, and the totals increase from 14% (at Spengler) to 25% (at Van Giesen Street) to 45% (at Swift Boulevard) to 82% (at Jadwin Avenue). The control point on GWW south of Columbia Point has 100% matching traffic. Overall, the great majority of traffic using GWW at its most congested point is generated by land uses south of Spengler Street.

The bottom rows of Table 3-10 show that once traffic passes that Columbia Point, they are distributed to the freeways as shown: one-third eastbound on I-182 and two-thirds southbound on SR 240. A very small amount enters I-182 westbound towards Yakima.

Table 3-10: Circulation Patterns on George Washington Way (Southbound, PM Peak Period)

Street Name / Location	Percent of Vehicles on Major Streets/Highways that also use GWW North of I-182/SR 240
George Washington Way North of Spengler Street	14%
George Washington Way North of Van Giesen Street	22%
Jadwin Avenue north of Van Giesen Street	3%
George Washington Way North of Swift Boulevard	33%
Jadwin Avenue north of Swift Boulevard	12%
George Washington Way North of Jadwin Avenue	42%
Jadwin Avenue North of George Washington Way	40%
George Washington Way North of I-182	*100%*
I-182 Eastbound across Columbia River	32%
I-182 Westbound toward Yakima	3%
SR 240 Southbound toward Kennewick	65%

Note: Analysis conducted using 2000 BFCG Travel Demand Model with select link assignment for George Washington Way south of Columbia Point.

Traffic Safety

Five years of vehicle crash data was obtained from WSDOT and the City of Richland and used to develop a list of the high crash intersections for the Richland Transportation Plan. This crash data only includes those collisions reported to the Washington Department of Transportation. Table 3-11 lists the top ten study intersection crash locations within the City of Richland, stratified by crash rate. A crash was attributed to the intersection if it occurred within 200 feet of a signalized intersection or 50 feet of an unsignalized intersection. Locations with a crash rate of 1.00 or higher are considered significant and should be investigated. The top nine intersections within the Richland area are in this significant crash rate category. The highest crash rate location is Lee Boulevard and Jadwin Avenue with a rate of 2.7 crashes per million entering vehicles; however, Highway 240 and Van Giesen had the highest total number of crashes (87) over the five years.

Table 3-11: Top 10 Collision Locations (1998 to 2002)

Street	Cross Street	Number of Collisions	Collision Rate (Collisions per MEV)
Jadwin Avenue	Lee Boulevard	69	2.71
George Washington Way	Williams Boulevard	28	2.07
Swift Boulevard	Thayer Drive	33	1.67
Swift Boulevard	Wright Avenue	29	1.64
Stevens Drive	Williams Boulevard	28	1.33
George Washington Way	Adams Street – Columbia Point Drive	83	1.23
George Washington Way	Lee Boulevard	56	1.16
Highway 240	Van Giesen	87	1.07
Stevens Drive	Swift Boulevard	27	1.01
Stevens Drive	Lee Boulevard	25	0.79

Note: Crash data provided by the City of Richland Public Works Department.
MEV = Millions of Entering Vehicles Per Year.

Existing collision data was plotted on an intersection-by-intersection basis to determine where potential safety issues may exist. While no conclusions can be drawn at many of the intersections, some issues should be noted at the following locations:

- Van Giesen Street and SR 240: A high crash intersection with a large amount of rear end collisions. It might be attributed to the short yellow time given to westbound vehicles on Van Giesen and short gap acceptance by drivers. One fatal crash was reported here.
- George Washington Way and Adams Street – Columbia Point: Another very high crash intersection that has a large number of injury accidents. This could be due to the speed differential between drivers exiting I-182 and those individuals currently on the road network.
- Queensgate Drive and Keene Road: A large number of failure to yield, turning crashes. Speed differential is one possible cause as is the lack of appropriate signage.

Trucks

Efficient truck movement plays a vital role in the economical movement of raw materials and finished products. The designation of through truck routes provides for this efficient movement while at the same time maintaining neighborhood livability, public safety, and minimizing maintenance costs of the roadway system. The Regional Transportation Plan for the Tri-Cities Metropolitan Area and the Benton-Franklin-Walla Walla RTPO identifies through truck routes in the Richland areas as SR 240 and I-182, which is shown in Figure 3-11.

The truck (heavy vehicle) volumes and percentages of the traffic stream were collected as part of the intersection turn movement counts in April 2003. Figure 3-12 shows the PM peak hour truck volume and percentages at each of the study intersection. Truck volumes exceed 25 vehicles per hour (vph) along SR 240, George Washington Way and Aaron Drive. Table 3-12 summarizes average daily highway truck traffic between 1989 and 1999 at three locations in Richland[5]

Table 3-12: Average Daily Highway Truck Traffic, 1989-1999

State Route	Mile Post	Location	1989	1991	1993	1995	1997	1999
240	30.63	W. of Stevens Dr.	590	705	850	900	920	956
240	31.99	N. of Jct. SR 224	675	705	1,190	1,260	1,200	1,275
224	8.73	E. of Yakima River	475	520	540	600	640	--
182	3.37	W. of Jct. SR 240	1,356	1,536	2,040	2,400	2,500	2,760

[5] *Regional Transportation Plan for the Tri-Cities Metropolitan Area and the Benton-Franklin-Walla Walla RTPO, 2001-2020.*

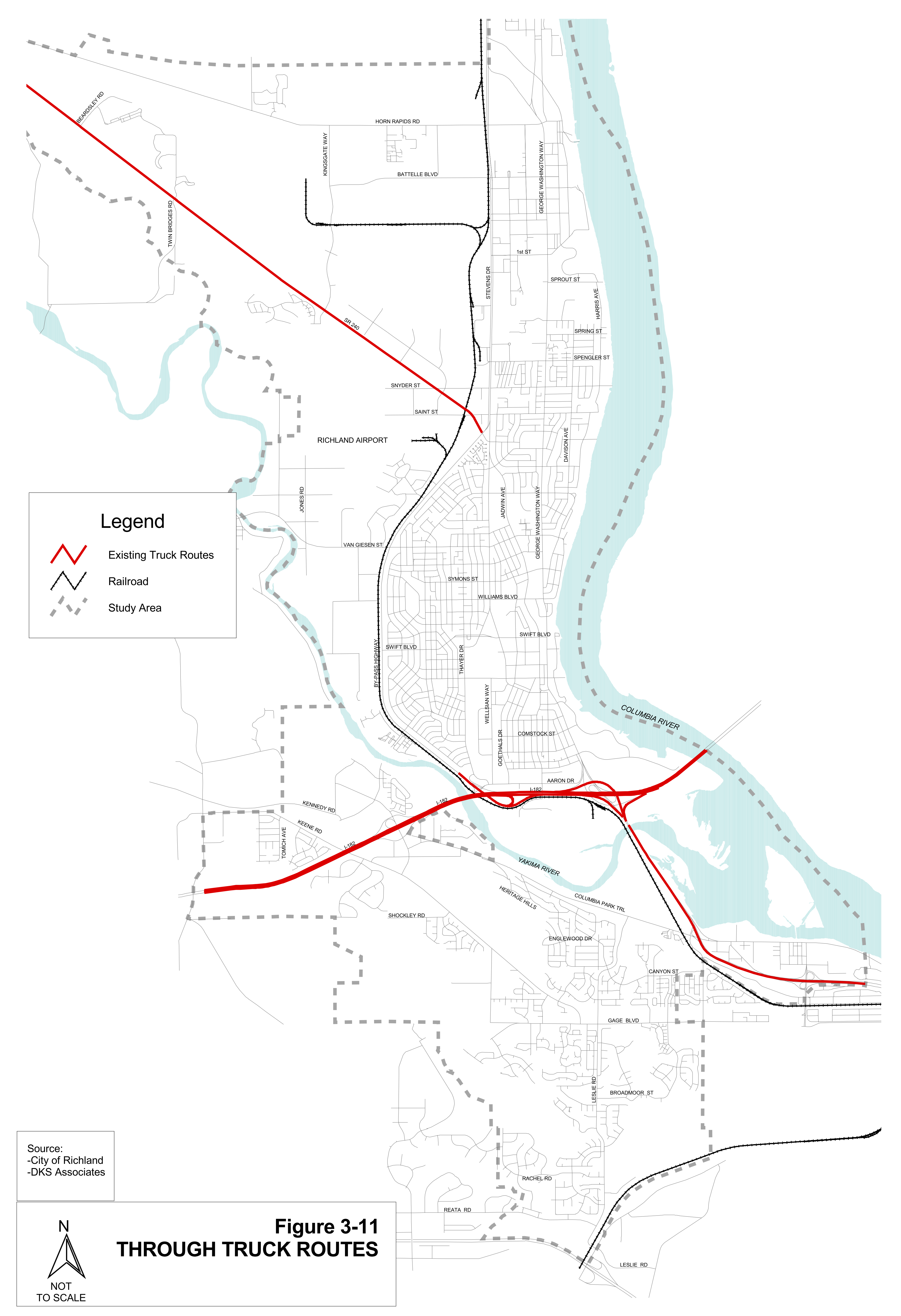


Figure 3-11
THROUGH TRUCK ROUTES

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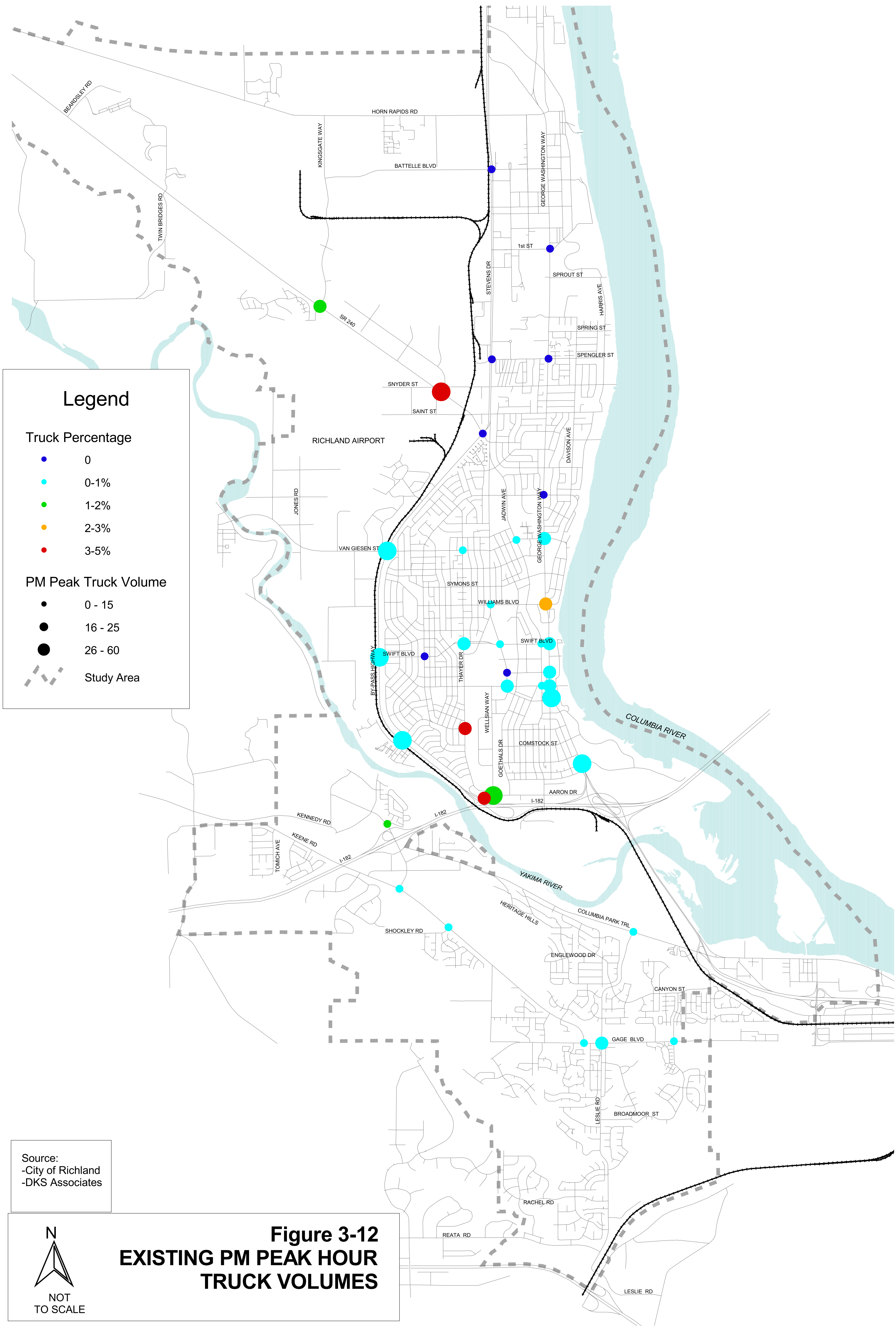

Source:
-City of Richland
-DKS Associates

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NOT TO SCALE

Figure 3-12
EXISTING PM PEAK HOUR TRUCK VOLUMES

Other Modes

The other modes to be addressed in Richland included in the Transportation Plan are: air, rail, pipeline, and marine. The primary issues to be considered for these types of facilities are the physical conflicts of system alignment (e.g., high pressure gas lines), and operational integration where high volume generators are involved (e.g., truck traffic from port facilities). Each of these travel modes are discussed in the following sections.

Aviation Facilities

The Richland Airport (Port of Benton) is a general aviation facility with two paved runways and a localizer instrument system. About 85 single and twin-engine aircraft are based there[6].

Rail

The Tri-City & Olympia Railroad Company (TCORC) has contracted with the Port of Benton to maintain and operate about 12 miles of rail formerly owned by the Department of Energy. DOE had planned to close the line when the port stepped in (1998) to preserve the line in hopes of spurring economic development in North Richland.

Along the rail line, the port received 750 acres of land and numerous buildings from the DOE for economic development purposes. A large portion of the land is comprised of the Port of Benton Manufacturing Mall. The TCORC operates from Kennewick (UP Connection) through Richland to the manufacturing mall and services the City of Richland's Horn Rapids Industrial Site via a spur line built by the city in 1999[7]. The rail line runs parallel and west of the SR 240 Bypass, as shown in all the report figures, and then continues north and west of Stevens Drive.

Marine

Port of Benton operates a barge terminal along the Columbia River just north of the city limit line. Freight trucks using this facility are included in the traffic counts done at study intersections in April 2003. River barge activity levels provided in the RTP were not specific about this terminal, but reflected an aggregate total of 4.4 million tons of barge cargo through the Ice Harbor dam. This is equivalent to 1,250 barge loads, and up to 145,000 trucks to service the barges.

Pipeline

Based on data presented in the Benton-Franklin RTP, none of the high-pressure gas lines in the region intersects with the study area.

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[6] Source: *Regional Transportation Plan*, Benton-Franklin Council of Governments, November 2001, Page 4-33.

[7] *Ibid*. Page 4-34.