Quality Food Centers (QFC) / University Village Access Study

Seattle, Washington

DRAFT FOR DISCUSSION PURPOSES ONLY

February 15, 2005

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FINDINGS & CONCLUSIONS

This study documents an analysis of existing and potential future access alternatives associated with the Quality Food Center (QFC) at the University Village (U-Village) shopping center.

Three access scenarios were analyzed under year 2015 p.m. peak hour conditions:

- **Scenario A**: Year 2015 with full access at the SE QFC Driveway on NE 45th Street (the same configuration as year 2004 existing conditions)
- **Scenario B**: Year 2015 with right-in, right-out (RIRO) only access at the SE QFC Driveway on NE 45th Street
- **Scenario C**: Year 2015 with a new traffic signal at the SE QFC Driveway on NE 45th Street

A matrix summary comparison of the three access scenarios is included in the table below.

Summary Comparison of Access Scenarios at NE 45th Street/SE QFC Driveway			
	Access Scenario A (Unsignalized Full Access)	**Access Scenario B (Right-In, Right-Out Only)**	**Access Scenario C (New Traffic Signal)**
Pros	*QFC Access:* Full access to QFC from NE 45th St is maintained *Impacts to U-Village Circulation:* None *Adjacent Street Impacts:* None	*Safety:* Potential conflict between Eastbound left-turns into QFC driveway and WB thru traffic on NE 45th St is eliminated	*QFC Access:* Full access to QFC from NE 45th St is maintained *Pedestrians:* Pedestrian crossing of NE 45th St is allowed with new signalized crosswalk *Safety:* Eastbound left-turns into QFC Driveway are protected by signal *Impacts to U-Village Circulation:* Little to none, as it was assumed that 38 trips that were exiting at 30th Ave NE would now exit at the QFC driveway on NE 45th St
Cons	*Pedestrians:* No pedestrian crossing of NE 45th St between Montlake Blvd NE and Union Bay Place *Safety:* Eastbound left-turns into QFC driveway must yield to 3 westbound thru lanes	*QFC Access:* Access to QFC from NE 45th St is restricted to right-in right-out (RIRO) *Pedestrians:* No pedestrian crossing of NE 45th St between Montlake Blvd NE and Union Bay Place *Impacts to U-Village Circulation:* Increased potential for conflict between vehicles and pedestrians with additional 248 trips that were entering as an eastbound left-turn at QFC driveway would have to travel through U-Village to get to QFC *Adjacent Street Impacts:* May create additional U-turns on NE 45th Street for EB traffic wishing to enter at QFC Driveway	*Adjacent Street Impacts:* Traffic on NE 45th Street may experience minor delays at the signal when green time is given to the traffic entering and exiting U-Village.
Neutral	*LOS:* No significant differences in LOS between the three access scenarios *Queuing:* All queues are estimated to be accommodated within the available storage	*LOS:* No significant differences in LOS between the three access scenarios *Queuing:* All queues are estimated to be accommodated within the available storage	*LOS:* No significant differences in LOS between the three access scenarios *Queuing* Assuming the Eastbound left-turn lane can be extended by 50 feet, all queues would be estimated to be accommodated within the available storage

The following briefly summarizes the key pros and cons for each of the three access scenarios:

Access Scenario A – Unsignalized Full Access

With Access Scenario A, full access to QFC/U-Village would be maintained. at the SE QFC Driveway on NE 45th Street. There would also be no impact to circulation on the U-Village site as a result of this access scenario.

There would continue to be a potential for conflict between eastbound left-turns and westbound through traffic on NE 45th Street at the SE QFC Driveway on NE 45th Street with Access Scenario A. Also, with Access Scenario A, there would be no pedestrian crossing of NE 45th Street as would be allowed with Access Scenario C.

Access Scenario B – Right-In, Right-Out (RIRO) Access

With Access Scenario B, access to QFC/U-Village would be restricted to RIRO, eliminating the potential for conflict between eastbound left-turns and westbound through traffic at the SE QFC Driveway on NE 45th Street.

This access restriction is likely to increase the potential for conflict between vehicles and pedestrians on the U-Village site as the approximately 250 p.m. peak hour trips that were entering the driveway would be re-routed to other driveways on 25th Avenue NE. Also, with Access Scenario A, there would be no pedestrian crossing of NE 45th Street as would be allowed with Access Scenario C.

Access Scenario C – New Traffic Signal

A signal warrant analysis was conducted to determine whether the SE QFC Driveway on NE 45th Street meets peak hour signal warrants under existing conditions. The results of the signal warrant analysis show that the SE QFC Driveway meets Warrant 3 (Peak Hour) under existing year 2004 conditions. Therefore, the SE QFC Driveway would also meet Warrant 3 in 2015. It is possible that the SE QFC Driveway would also meet Warrant 1 (Eight Hour Vehicular Volume) and Warrant 2 (Four Hour Vehicular Volume) under existing year 2004 conditions, although these warrants were not evaluated in this study.

In 2015, with the new traffic signal in Access Scenario C, full access to QFC/U-Village is maintained at the SE QFC driveway on NE 45th Street and the potential for conflict between eastbound left-turns and westbound through traffic is eliminated with a protected left-turn phase. The new signal may also have the positive affect of metering and reducing curb-lane speeds for vehicles traveling westbound on NE 45th Street and destined up the NE 45th Street viaduct which would also improve safety at the intersection.

Although eastbound and westbound through traffic on NE 45th Street may experience minor delays as a result of the new traffic signal, the anticipated 95th percentile queue for the eastbound through movement (300') would not be expected to extend into the intersection of NE 45th Street/Montlake Blvd NE. There would also be little or no impact to circulation with the U-Village site as a result of the new signal in Access Scenario C.

Additionally, a crosswalk to allow pedestrians to cross NE 45th Street at the SE QFC Driveway would be provided with the new signal. Currently pedestrians wishing to cross NE 45th Street are required to cross at either the intersection with Montlake Blvd NE or the intersection with Union Bay Pl (these intersections are approximately 1,400 feet apart).

With the new traffic signal in Access Scenario C, the 95th percentile queue for the eastbound left-turn (275 feet) is anticipated to exceed the available storage by approximately 1 vehicle. It appears feasible to extend the eastbound left-turn pocket into the SE QFC Driveway on NE 45th Street by approximately 50 feet, from 240 feet to 290 feet. In order to extend the left-turn pocket, the eastbound through lanes on NE 45th Street (east of the NE 45th St/Montlake Blvd NE intersection) would have to be narrowed from 13 feet each to 11 feet and 12 feet.

INTRODUCTION

This study documents an analysis of existing and potential future access alternatives associated with the Quality Food Center (QFC) at the University Village (U-Village) Shopping Center located in the University District of Seattle (see **Figure 1**). The University Village Shopping Center consists of University Village and the adjoining property owned by QFC.

Vehicular access to the University Village site is currently provided via six driveways; three on 25th Avenue NE, two on NE 45th Street, and one on 30th Avenue NE. It should be noted that the Northeast Driveway on 30th Avenue NE and the Southeast Driveway on NE 45th Street are located on QFC property. In addition, there are two driveways on 25th Avenue NE that provide access to a small portion of the University Village retail use (Mud Bay Granary, Smith & Hawken, The UPS Store, Beauty Works, and AT&T Wireless). These driveways were not included as study intersections for the purpose of this access study.

In February 2004, the City of Seattle notified QFC and U-Village that they intended to restrict eastbound left-turns into the QFC Driveway due to safety concerns. The safety concerns were related to vehicular conflicts between eastbound left-turns into the SE QFC Driveway on NE 45th Street and westbound traffic on NE 45th Street. In March 2004, the City agreed to interim improvements including striping and signage while QFC worked with the City to study a long-term solution to minimize the potential for conflicts at this driveway.

It is our understanding that the interim improvements on NE 45th Street have been effective. In the event that the interim improvements are no longer effective, we have prepared this study to evaluate alternative access scenarios at the SE QFC Driveway located on NE 45th Street.

Based on our discussions with the City of Seattle, the following tasks were undertaken to evaluate access associated with University Village:

- Assessment of existing conditions through field reconnaissance and review of existing planning documents.
- Documentation of collision history for the latest six-year period at study area intersections and corridors adjacent to University Village.
- Evaluation of 2004 existing p.m. peak hour level of service (LOS) at the following study intersections in the study area, which include six site driveways (see **Figure 1**):
    1. 25th Avenue NE/Montlake Blvd NE (signalized)

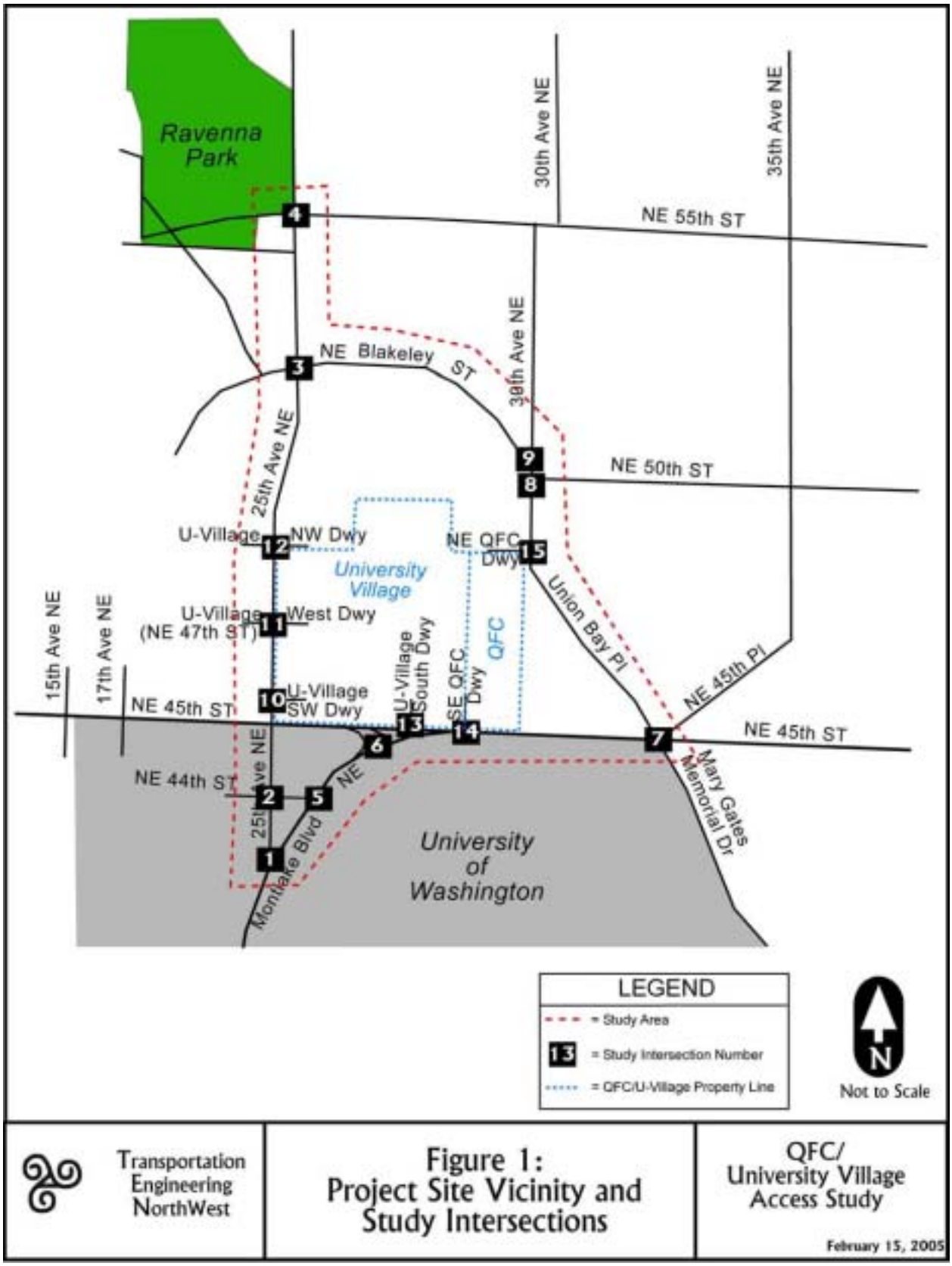
2. 25th Avenue NE/NE 44th Street (signalized)
3. 25th Avenue NE/NE Blakely Street (signalized)
4. 25th Avenue NE/NE 55th Street (signalized)
5. Montlake Boulevard NE/NE 44th Street (signalized)
6. NE 45th Street/Montlake Boulevard NE (signalized)
7. NE 45th Street/Union Bay Place/NE 45th Place (signalized)
8. 30th Ave NE/NE 50th Street (stop-controlled)
9. 30th Ave NE/NE Blakeley Street (stop-controlled)
10. 25th Avenue NE/Southwest University Village Driveway (stop-controlled)
11. 25th Avenue NE/West University Village Driveway (NE 47th Street) (signalized)
12. 25th Avenue NE/Northwest University Village Driveway (stop-controlled)
13. NE 45th Street/South University Village Driveway (stop-controlled)
14. NE 45th Street/Southeast QFC Driveway (stop-controlled)
15. 30th Avenue NE/Northeast QFC Driveway (stop-controlled)

- Evaluation of future year 2015 p.m. peak hour level of service (LOS) at the study intersections for three access scenarios at the NE 45th Street/Southeast QFC Driveway; A) unsignalized full access, B) right-in, right-out only, and C) signalized full access
- Vehicle queuing analysis at the site access driveways for year 2015 conditions with Access Scenario C (a new traffic signal) at the SE QFC Driveway on NE 45th Street.
- Signal warrant analysis at the SE QFC Driveway on NE 45th Street for future year 2015 p.m. peak hour conditions.
- Evaluation of on-site circulation for the three access alternatives.

Primary Data and Information Sources

- *Highway Capacity Manual (HCM), Special Report 209,* Transportation Research Board, year 2000.
- *Trip Generation, 5th Edition,* Institute of Transportation Engineers, year 1991.
- City of Seattle Traffic Volume Data, 1997-2003.
- City of Seattle Signal Timing Data, received October 2004.
- Year 2004 PM peak hour traffic counts, All Traffic Data.

- January 1998 through December 2003 collision data, City of Seattle.
- City of Seattle 2005 -2010 Proposed Capital Improvement Program (CIP).
- *University Area Transportation Study*, Mirai Associates, April 2002.
- *University Village North Development Traffic Impact Analysis,* Transportation Solutions Inc, November 2000.
- *University of Washington Master Plan Transportation Technical Report,* DKS Associates, August 24, 2001.
- Metro/King County Website as of January 2005.


Ravenna Park
30th Ave NE
35th Ave NE
NE 55th ST
NE Blakeley ST
38th Ave NE
25th Ave NE
NE 50th ST
U-Village NW Dwy
NE QFC Dwy
University Village
U-Village West Dwy
(NE 47th ST)
15th Ave NE
17th Ave NE
Union Bay Pl
NE 45th Pl
U-Village South Dwy
SE QFC Dwy
QFC
U-Village SW Dwy
NE 45th ST
NE 45th ST
NE 44th ST
Mary Gates Memorial Dr
Montlake Blvd NE
University of Washington
LEGEND
= Study Area
= Study Intersection Number
= QFC/U-Village Property Line
N
Not to Scale
Transportation Engineering NorthWest
Figure 1: Project Site Vicinity and Study Intersections
QFC/ University Village Access Study
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EXISTING CONDITIONS

This section describes existing transportation system conditions in the study area. Existing conditions described include an inventory of existing roadways, existing traffic volumes, collision history at the study intersections, intersection levels of service (LOS), public transportation services, non-motorized transportation facilities, and planned transportation improvements.

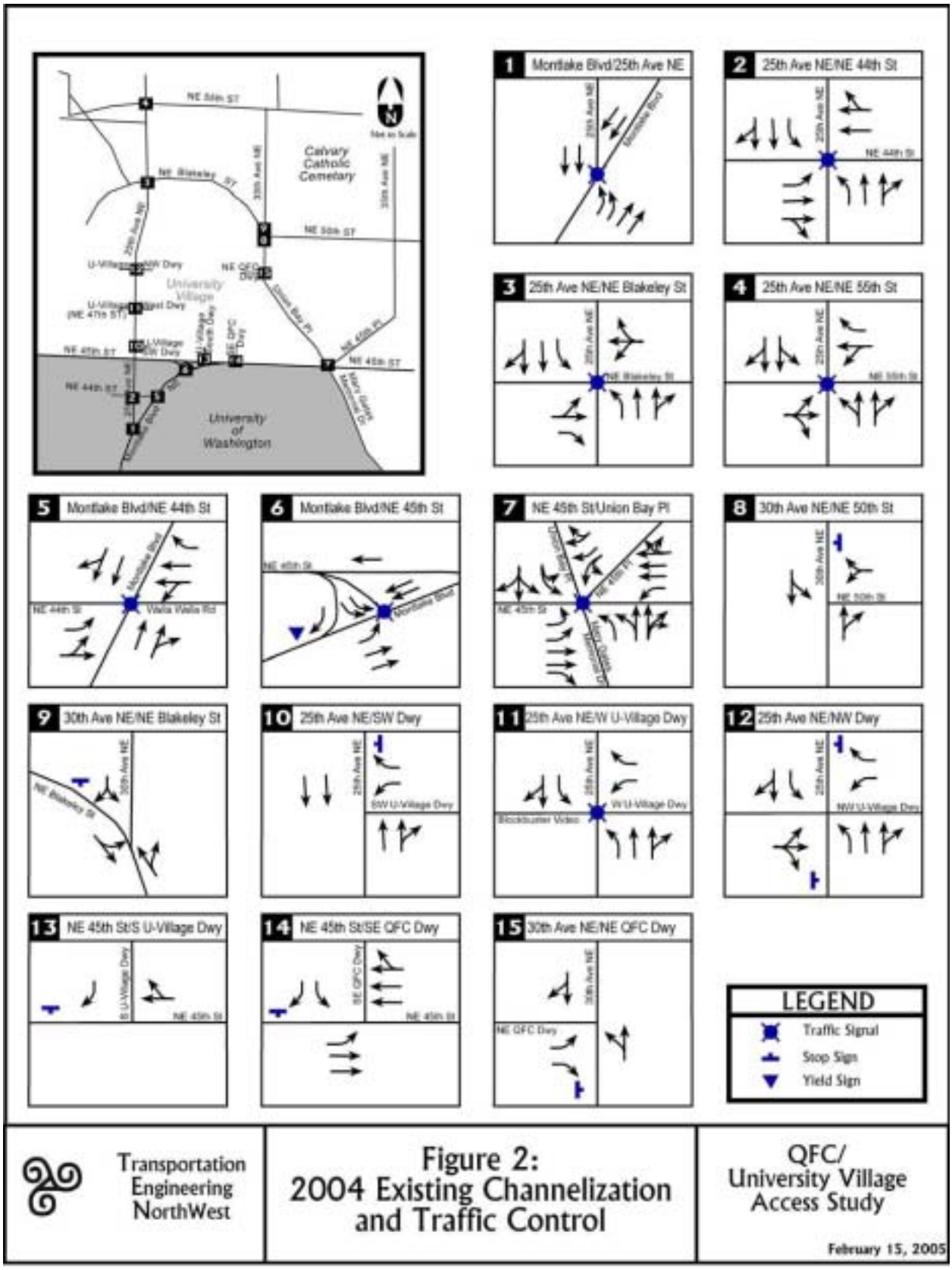
Roadway Network

The following paragraphs describe existing roadways that would be used as major routes for site access. Roadway characteristics are described in terms of number of lanes and average daily traffic volumes. The existing channelization and traffic control at the study intersections is documented in **Figure 2**.

Montlake Boulevard NE (State Route 513) is a four-lane, two-way principal arterial providing north and south traffic flow between SR 520 and NE 45th Street. The posted speed limit on Montlake Boulevard NE is 35 miles per hour. Montlake Boulevard NE carries approximately 48,200 vehicles on an average weekday based on 2002 traffic counts provided by the City of Seattle. Curb, gutter, and sidewalks are provided along both sides of Montlake Boulevard NE.

NE 45th Street is a three to six-lane, east-west principal arterial that connects Sand Point Way and its adjacent neighborhoods in northeast Seattle (Laurelhurst, View Ridge, and Windermere) to the to I-5 and SR 520 through the University District and Montlake. In the vicinity of University Village, NE 45th Street includes two eastbound lanes, three westbound lanes, and a center two-way left-turn lane. The posted speed limit on NE 45th Street is 35 miles per hour. The roadway consists of curb, gutter and sidewalks on both sides of the street. West of Union Bay Place, NE 45th Street carries approximately 41,350 vehicles on an average weekday based on 2002 traffic counts provided by the City of Seattle.

25th Avenue NE is a two to five-lane principal arterial that provides north-south traffic flow between Lake City Way and Montlake Boulevard. In the vicinity of University Village, 25th Avenue NE is five lanes with a center two-way left-turn lane. During the AM peak hour, there are two southbound travel lanes and one northbound travel lane, and parking is allowed on the east side of the roadway. During the PM peak hour, there are two northbound travel lanes and one southbound travel lane, and parking is allowed on the west side of the street. Parking is prohibited on the west side of 25th Avenue NE from 7 to 9 a.m. and on the east side of the street from 4 to 6 p.m. Sidewalks, curbs, and gutters exist on both sides of the street and the posted speed limit on 25th Avenue NE is 30 mph. South of NE 47th Street, 25th Avenue NE carries approximately 19,350 vehicles on an average weekday based on 2002 traffic counts provided by the City of Seattle.


Calvary Catholic Cemetery
University Village
University of Washington
1 Montlake Blvd/25th Ave NE
2 25th Ave NE/NE 44th St
3 25th Ave NE/NE Blakeley St
4 25th Ave NE/NE 55th St
5 Montlake Blvd/NE 44th St
6 Montlake Blvd/NE 45th St
7 NE 45th St/Union Bay Pl
8 30th Ave NE/NE 50th St
9 30th Ave NE/NE Blakeley St
10 25th Ave NE/SW Dwy
11 25th Ave NE/W U-Village Dwy
12 25th Ave NE/NW Dwy
13 NE 45th St/S U-Village Dwy
14 NE 45th St/SE QFC Dwy
15 30th Ave NE/NE QFC Dwy
LEGEND
Traffic Signal
Stop Sign
Yield Sign
Transportation Engineering NorthWest
Figure 2: 2004 Existing Channelization and Traffic Control
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NE Blakely Street is a two-lane east-west collector arterial that along with 30th Avenue NE and Union Bay Place, links the principal arterials of NE 45th Street and 25th Avenue NE. The posted speed limit on NE Blakely Street is 30 mph. The Burke-Gilman Trail is located adjacent to NE Blakely Street on the south side of the roadway from 25th Avenue NE to 30th Avenue NE

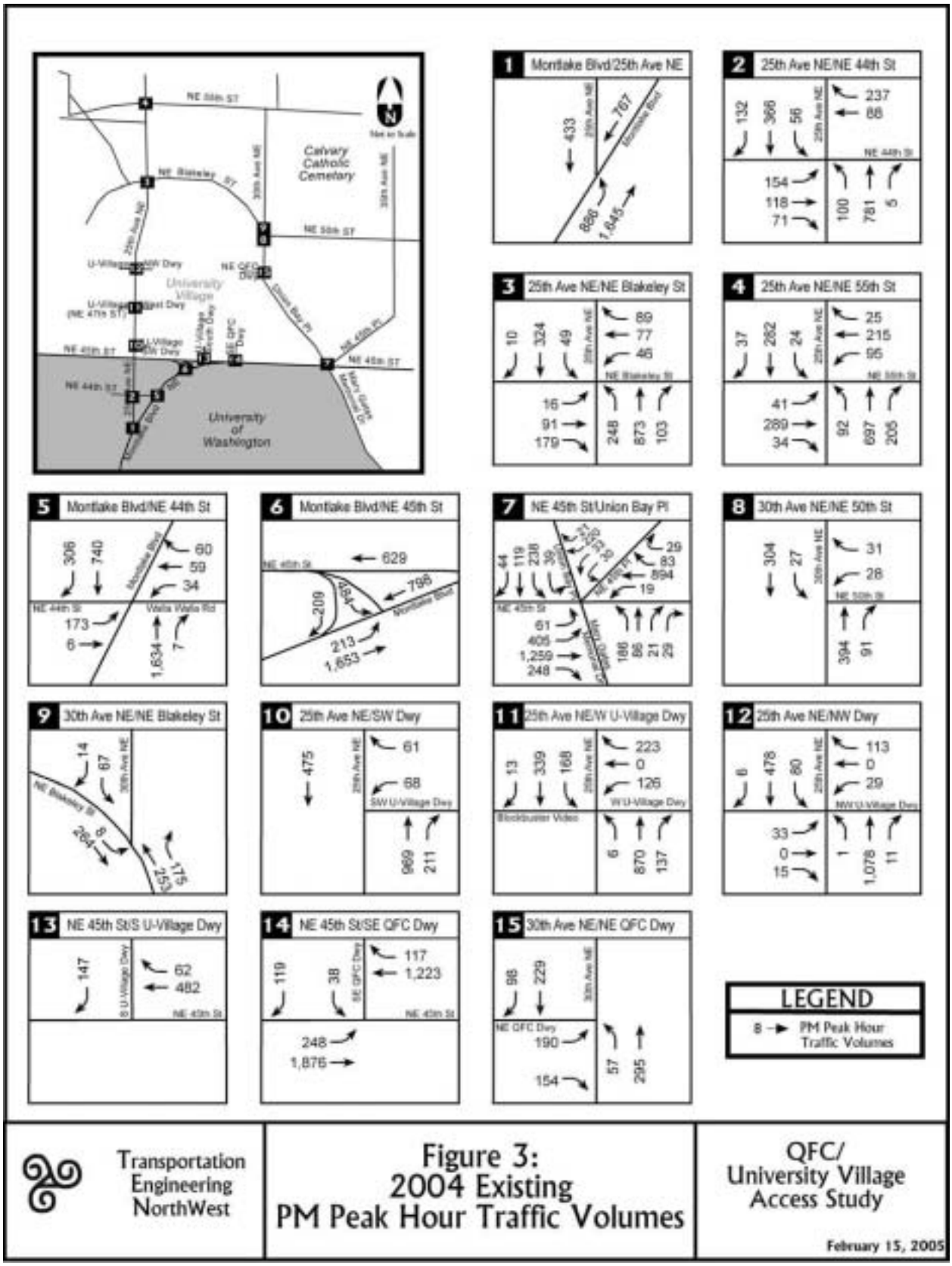
Union Bay Place is a collector arterial that connects NE Blakely Street and 30th Avenue NE to NE 45th Street. Curbs, gutters, and sidewalks do not exist on Union Bay Place and the posted speed limit is 30 mph. Both marked and unmarked parallel and angle on-street parking is provided along Union Bay Place to serve the various commercial uses located along the roadway.

30th Avenue NE connects NE Blakely Street and Union Bay Place in the project vicinity. The Burke-Gilman Trail crosses 30th Avenue NE just north of the Northeast QFC Driveway. 30th Avenue NE has curb, gutter and sidewalk along the east side of the street between the Burke-Gilman Trail and the Northeast QFC Driveway.

Peak-Hour Traffic Volumes

Existing weekday p.m. peak hour traffic volumes at the study intersections were counted on Wednesday, October 13, 2004 by *All Traffic Data*, a local traffic counting firm. The counts were conducted two weeks after the University of Washington started its fall quarter in order to allow traffic in the University District to stabilize. Also, the counts were conducted in October because University Village is a shopping center and October should be considered a "typical" month for traffic at a shopping center based on data presented in the Institute of Transportation Engineers (ITE) *Trip Generation*, 5th Edition. **Figure 3** illustrates the existing 2004 weekday p.m. peak period traffic volumes at the study area intersections.

The weekday p.m. peak hour traffic volumes represent the highest hourly volume of vehicles passing through an intersection on a typical weekday during the 4-6 p.m. peak period. Traffic counts conducted between 2000 and 2003 by the Seattle Department of Transportation (SDOT) showed that the a.m. peak hour volumes on streets adjacent to University Village were approximately 10 to 12 percent lower than weekday p.m. peak hour volumes. Similarly, traffic counts conducted in April 2000 for the University Village North Development *Traffic Impact Analysis* showed that the Saturday peak hour volumes on the streets adjacent to the University Village site were approximately 5 percent lower than weekday p.m. peak hour volumes. Therefore, the weekday p.m. peak hour was analyzed in this study because it represents the time period where the combination of traffic volumes are expected to be at their peak.



Transportation Engineering NorthWest

Figure 3:
2004 Existing
PM Peak Hour Traffic Volumes

QFC/
University Village
Access Study

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Collision History

Per discussions with the City of Seattle, the most recent six-year historical collision records at the signalized study area intersections and on roadways adjacent to the site were reviewed for the six-year period from January 1, 1998 to December 31, 2003. Collision data was provided by the City of Seattle in October 2004. Summaries of collision types, total collisions, and annual average collisions during this period at the study intersections are provided in **Table 1**. The data for mid-block corridors is summarized in **Table 2**. Data at specific driveways was not available. Driveway collisions are assumed to be included in the data for mid-block corridors.

Based on City of Seattle standards, signalized intersections with an average of less than 10 collisions per year and unsignalized (stop-controlled) intersections with an average of less than 5 collisions per year are not considered high collision locations.

Table 1
Intersection Collision Analysis Summary
January 1, 1998 to December 31, 2003

#	Study Intersection	Collision Type: Right-Angle	Rear End	Side Swipe	Ped/Cycle	Other	6-Year Total Collisions	Average Annual Collisons
	Signalized Intersections							
1	25th Ave NE/Montlake Blvd NE	1	0	0	0	2	3	0.50
2	25th Ave NE/NE 44th Street	8	1	2	0	0	11	1.83
11	25th Ave NE/NE 47th Street	12	3	0	0	0	15	2.50
3	25th Ave NE/NE Blakely St	27	2	0	11	1	41	6.83
4	25th Ave NE/NE 55th Street	16	0	0	1	0	17	2.83
5	Montlake Blvd NE/NE 44th Street	7	2	1	2	3	15	2.50
6	Montlake Blvd NE/NE 45th St	3	0	2	0	1	6	1.00
7	NE 45th St/Union Bay Pl/NE 45th Pl	30	0	2	0	1	33	5.50
	Stop-Controlled Intersections							
8	30th Ave NE/NE 50th Street	0	0	0	0	0	0	0.00
9	30th Ave NE/NE Blakeley St	0	0	0	1	0	1	0.17

Source: City of Seattle Department of Transportation Collision Records.

As shown in **Table 1**, based on the latest six year collision history, the eight signalized study intersections on average experience less than 10 collisions per year, and thus, are not considered high collision locations based on the City's standards. The two stop-controlled study intersections also are not considered high collision locations since they experience less than 5 collisions per year on average.

Table 2
Corridor Collision Analysis Summary
January 1, 1998 to December 31, 2003

	Collision Type						
Corridor	**Right-Angle**	**Rear End**	**Side Swipe**	**Ped/Cycle**	**Other**	**6-Year Total Collisions**	**Average Annual Collisons**
25th Ave NE:							
Montlake Blvd to NE 44th St	1	7	0	0	0	8	1.33
NE 44th St to NE 47th St	3	18	5	4	4	34	5.67
NE 47th St to NE 49th St	12	5	1	2	7	27	4.50
NE 49th St to NE Blakeley St	19	9	8	2	2	40	6.67
NE Blakeley St to NE 54th St	7	6	5	4	6	28	4.67
NE 54th St to NE 55th St	5	7	1	0	3	16	2.67
NE Blakeley St:							
25th Ave NE to 30th Ave NE	3	4	0	2	10	19	3.17
30th Ave NE:							
NE Blakeley to Union Bay Pl	6	0	1	3	0	10	1.67
NE Blakeley to NE 50th Street	0	1	0	0	1	2	0.33
Union Bay Place:							
NE 30th St to NE 45th St	17	2	3	0	7	29	4.83
NE 45th St:							
Montlake Blvd to Union Bay Pl	50	24	12	6	5	97	16.17

Source: City of Seattle Department of Transportation Collision Records.

As shown in **Table 2**, based on the latest six year collision history, the corridor that experienced the highest number of collisions was NE 45th Street from Montlake Boulevard to Union Bay Place, with an average of 16.17 accidents per year. There are numerous driveways on the north side on NE 45th Street in this corridor. The accident data does not identify the specific locations of the collisions along the corridor; however it was estimated from the collision data that approximately 56 percent of the 6-year total collisions occurred at driveways on the north side of NE 45th Street.

Year 2004 Intersection Operational Analyses

Level of service (LOS) serves as an indicator of the quality of traffic flow and degree of congestion at an intersection or roadway segment. It is a measure of vehicle operating speed, travel time, travel delays, and driving comfort. The LOS grading ranges from A to F, such that LOS A is assigned when low delays are present and low volumes are experienced. LOS F indicates long delays and/or forced flow.

Table 3 summarizes the delay range for each level of service at signalized and unsignalized intersections. The methods used to calculate the levels of service are described in the *Highway Capacity Manual* (Special Report 209, Transportation Research Board, 2000).

Table 3
Level of Service Criteria for Signalized and Unsignalized Intersections

Level of Service	Signalized Intersection Delay Range (sec)	Unsignalized Intersection Delay Range (sec)
A	Ω10	Ω10
B	> 10 to Ω20	> 10 to Ω15
C	> 20 to Ω35	> 15 to Ω25
D	> 35 to Ω55	> 25 to Ω35
E	> 55 to Ω80	> 35 to Ω50
F	> 80	> 50

Source: "Highway Capacity Manual", Special Report 209, Transportation Research Board, 2000

An existing weekday p.m. peak hour level of service analysis was conducted at the fifteen study intersections. Existing signal timing used in the analysis was provided by the City of Seattle Department of Transportation (SDOT). The LOS results are summarized in **Table 4**. Detailed LOS summary worksheets are provided in **Appendix A**.

Table 4
Year 2004 Existing PM Peak Hour Level of Service Summary

#	Study Intersection	2004 Existing Conditions LOS[1]	Delay (sec)	V/C[2]
	Signalized Intersections			
1	25th Ave NE / Montlake Blvd NE	B	17.9	0.61
2	25th Ave NE / NE 44th Street	C	34.0	0.60
11	25th Ave NE / NE 47th Street (West U-Village Dwy)	B	12.0	.61
3	25th Ave NE / NE Blakely Street	B	12.5	0.53
4	25th Ave NE / NE 55th Street	B	16.2	0.70
5	NE 44th Street / Montlake Blvd NE	C	25.7	0.66
6	NE 45th Street / Montlake Blvd NE	B	19.2	0.66
7	NE 45th Street / Union Bay Place	D	50.3	0.81
	Stop-Controlled Intersections			
8	8. 30th Ave NE / NE 50th Street			
	Southbound Left	A	8.7	
	Westbound Left-Right	B	13.7	
9	30th Ave NE / NE Blakely Street			
	Southbound Left-Right	B	14.8	
	Eastbound Left	A	8.4	
10	25th Ave NE / Southwest U-Village Dwy			
	Westbound Left	C	19.8	
	Westbound Right	A	9.8	
12	25th Ave NE / Northwest U-Village Dwy			
	Southbound Left	B	12.2	
	Westbound Left	E	48.7	
	Westbound Right	B	12.7	
13	NE 45th Street / South U-Village Dwy			
	Southbound Right	C	16.1	
14	NE 45th Street / Southeast QFC Dwy			
	Southbound Left	E	40.3	
	Southbound Right	B	10.1	
	Eastbound Left	C	17.3	
15	30th Ave NE / Northeast QFC Dwy			
	Northbound Left	A	8.1	
	Eastbound Left	D	28.5	
	Eastbound Right	A	11.3	

[1] LOS = Level of Service
[2] V/C = Volume/Capacity ratio

As shown in **Table 4**, all of the signalized study intersections currently operate at LOS D or better during the weekday p.m. peak hour. All movements at the unsignalized study intersections also operate at LOS D or better during the

weekday p.m. peak hour, with the exception of the southbound left-turn at the SE QFC Driveway on NE 45th Street which currently operates at LOS E.

Public Transportation Services

King County-Metro provides public transportation service within the study area. The following summarizes the existing transit routes serving the site as of January 2005:

Route 25 serves downtown Seattle, Eastlake, Montlake, University Village and Laurelhurst. Route 25 travels on NE 45th Street in the project vicinity and a transit stop for Route 25 is provided just west of the South University Village driveway. Weekday service is provided every 30 to 45 minutes from approximately 6:00 a.m. to 7:00 p.m.

Route 65 serves the University District, the University of Washington, University Village, Ravenna, Wedgewood and Lake City. Weekday and weekend service is provided every 15 to 60 minutes from approximately 6:00 a.m. to 12:00 a.m. Route 65 travels on NE 45th Street and 35th Avenue NE in the project vicinity. The nearest transit stop for Route 65 is located on NE 45th Street just west of the intersection of Montlake Boulevard NE/NE 45th Street.

Route 68 serves the University District, the University of Washington, University Village, Ravenna, Wedgewood, and Northgate. Route 68 travels on 25th Avenue NE in the project vicinity, and transit stops are located adjacent to the West University Village Driveway (NE 47th Street). Weekday service is provided every 20 to 30 minutes from approximately 6:00 a.m. to 7:00 p.m. Saturday service is provided approximately every 30 minutes from 9:00 a.m. to 7:00 p.m. No service is provided on Sunday.

Route 74 serves Downtown Seattle (peak hours only), Seattle Center, Fremont, Wallingford, the University District, Ravenna, and Sand Point. Route 74 travels on NE 55th Street in the project vicinity. Weekday and weekend service is provided every 30 minutes from approximately 5:00 a.m. to 1 a.m. Service to Downtown Seattle is provided every 30 minutes from 6:00 a.m. to 9:00 a.m. and service to Sand Point from Downtown is provided every 30 minutes from 3:30 p.m. to 7:00 p.m.

Route 75 serves the University of Washington, Sand Point, Lake City, Northgate, Crown Hill, and Ballard. Route 75 travels on NE 45th Street and Montlake Boulevard in the project vicinity, and a transit stop for Route 75 is provided just west of the intersection of Montlake Boulevard NE/NE 45th Street. Weekday service is provided every 15 to 30 minutes from approximately 5:00 a.m. to 12:00 a.m. Saturday and Sunday service is provided approximately every 30 minutes from 6:30 a.m. to 1:00 a.m.

Route 243 serves Jackson Park, Lake City, Ravenna, University Village, Montlake, and Bellevue. Weekday morning service to Bellevue is provided every 20 to 40 minutes between 6:30 a.m. and 8:30 a.m. Weekday evening service to Jackson Park is provided every 25 to 35 minutes between 4:00 p.m. and 6:00 p.m. Route 243 travels on 25th Avenue NE and Montlake Boulevard NE in the project vicinity. The nearest transit stop for Route 243 is provided on 25th Avenue NE, adjacent to the West University Village driveway.

Route 372 serves the University District, University Village, Ravenna, Lake City, Lake Forest Park, the Northshore Park and Ride, the Kenmore Park and Ride, the Bothell Park and Ride, and the Woodinville Park and Ride. Weekday service is provided approximately every 15 to 30 minutes from 5:30 a.m. to 10:00 p.m. Route 372 travels on 25th Avenue NE in the project vicinity, and the nearest transit stop for route 372 is located on 25th Avenue NE, adjacent to the West University Village driveway.

Non-motorized Transportation Facilities

Within the study area, pedestrian facilities including sidewalks are provided on both sides on Montlake Boulevard NE, on both sides of 25th Avenue NE, and on both sides of NE 45th Street east of Montlake Boulevard NE. On the NE 45th Street viaduct (west of Montlake Boulevard NE) a sidewalk exists on the south side of the street. On the University Village site, a well-dedicated system of sidewalks and pedestrian crosswalks is provided. Crosswalks also exist at all signalized intersections in the study area.

Currently, pedestrians wishing to cross NE 45th Street in the study area are required use crosswalks located at either the intersection with Montlake Blvd NE or the intersection with Union Bay Pl (these intersections are approximately 1,400 feet apart). Additionally, an unsignalized crosswalk across 25th Avenue NE located just north of the SW U-Village driveway was recently removed and pedestrian traffic is redirected to use signalized crosswalks located at either NE 44th Street of NE 47th Street.

The Burke-Gilman Trail is a trail for non-motorized modes of travel that serves the neighborhoods of Ballard, Fremont, and the University District before turning into the Sammamish River Trail in Bothell. Near University Village, the trail runs parallel to NE Blakely Street and intersects 30th Avenue NE just north of the Northeast QFC driveway on 30th Avenue NE. Trail traffic is stop-controlled at this intersection.

Planned Transportation Improvements

Existing planning documents were reviewed to determine future transportation improvements planned in the project vicinity. The existing documents reviewed

include the City of Seattle 2005-2010 Proposed Capital Improvement Program, the University Area Transportation Study, and the University of Washington Master Plan.

City of Seattle CIP. The City of Seattle's 2005-2010 Proposed Capital Improvement Program (CIP) was examined to determine if there are any planned transportation improvements in the vicinity of the proposed project. According to the transportation section of the CIP, there are no planned transportation improvements identified in the study area.

University Area Transportation Study. The University Area Transportation Study (UATS) Final Report (April, 2002) was also reviewed for potential transportation improvements in the University Village area. The goal of the UATS is to provide a comprehensive, multimodal transportation plan for the area that will serve as a blueprint for financing and programming improvements in the University area over the next decade. Potential improvement projects in the UATS were prioritized as either "Early Action", "High Priority", "Medium Priority", and "Low Priority". It was the recommendation of the UATS study team that the City make attempts to complete the first three categories of projects by the year 2010. The following safety improvement projects were identified in the University Village area:

- Improve Burke-Gilman Trail crossing safety at 25th Avenue NE (*Early Action*)
- Create new pedestrian/bike trail connecting Burke-Gilman Trail with University Village at NE 47th Street (West Village Driveway) (*High Priority*)
- Install signal and safety improvements at Burke-Gilman trail crossing with 30th Avenue NE/NE Blakely Street (*High Priority*)
- Build sidewalks on the west side of 30th Avenue NE from Union Bay Place to NE 55th Street (*High Priority*)
- Build curbs, gutters, and sidewalks on NE Blakely Street/30th Avenue NE/Union Bay Place from 25th Avenue NE to NE 45th Street (*Medium Priority*).
- Build sidewalks on the south side of NE 50th Street from 30th Avenue NE to 35th Avenue NE (*Medium Priority*).

Since none of these improvements are included on the City's current 2005-2010 CIP, none of them are currently funded.

University of Washington Master Plan. The University of Washington's 2002-2012 Master Plan was also examined to determine if there are any planned transportation improvements in the vicinity of the proposed project. According to the Transportation Technical Report, there was one proposed improvement in the

study area. The improvement was to add a Southeast left-turn lane to the intersection of NE 45th Street/Union Bay Place. This improvement was also proposed by the University Village North development. In a memo dated June 26, 2003 from the City of Seattle, it was determined that adding a SE left-turn lane at this intersection was not feasible. However in 2003 the left-turn pocket was extended from 60 to 140 feet and the curb lane on the Southeast approach was changed from a thru-right to a shared left-thru-right to allow both approach lanes to turn left to NE 45th Street eastbound.

FUTURE YEAR 2015 ANALYSIS

The following section of the report describes the future year 2015 operations at the study intersections. The discussion includes future traffic forecasts and a future year operational and queuing analysis for three access scenarios. No other access alternatives for access to the QFC at U-Village were apparent at the time of this study. Therefore, the following three access scenarios were analyzed:

- **Scenario A**: Year 2015 with full access at the SE QFC Driveway on NE 45th Street (the same configuration as year 2004 existing conditions)
- **Scenario B**: Year 2015 with right-in, right-out (RIRO) only access at the SE QFC driveway on NE 45th Street
- **Scenario C**: Year 2015 with a new traffic signal at the SE QFC Driveway on NE 45th Street

Future Roadway Network

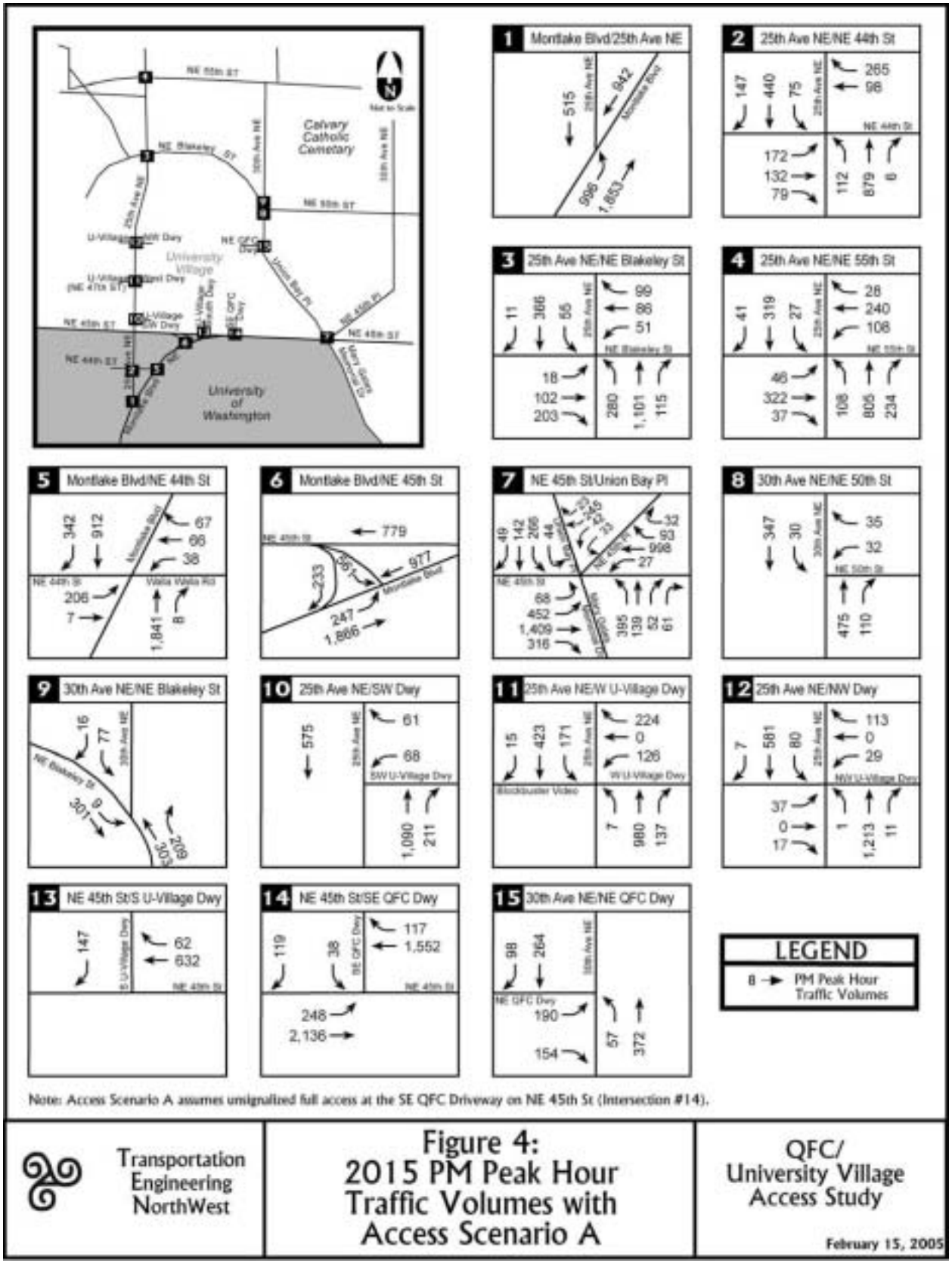
The future year 2015 channelization at the study intersections was assumed to be the same as 2004 existing conditions because there were no planned transportation improvements identified in the study area that would affect the geometry or operations of the study intersections.

Future Traffic Volumes

A review of historical (1997-2003) traffic volumes on 25th Avenue NE and 45th Avenue NE in the vicinity of University Village indicated that traffic volumes in the project vicinity have remained relatively unchanged over the past 7 years. To account for growth in background traffic, year 2015 traffic volumes were developed by applying an annual growth rate of one percent to the existing 2004 traffic volumes, and also adding trips from known pipeline projects in the area. Because growth in traffic volumes has been negligible in the area, the annual growth rate of one percent should be considered conservative. The following pipeline projects were also added to existing volumes to estimate future year volumes:

1. 25th Avenue Mixed Use (20,000 sf commercial and 66,000 sf office)
2. Talaris Institute (100-seat conference center, 127,000 sf office, day care, and 81 multi-family residential units)

Figure 4 illustrates future 2015 traffic volumes during weekday p.m. peak hour conditions with Access Scenario A (unsignalized full-access).


Calvary Catholic Cemetary
University Village
University of Washington
Not to Scale
1 Montlake Blvd/25th Ave NE
2 25th Ave NE/NE 44th St
3 25th Ave NE/NE Blakeley St
4 25th Ave NE/NE 55th St
5 Montlake Blvd/NE 44th St
6 Montlake Blvd/NE 45th St
7 NE 45th St/Union Bay Pl
8 30th Ave NE/NE 50th St
9 30th Ave NE/NE Blakeley St
10 25th Ave NE/SW Dwy
11 25th Ave NE/W U-Village Dwy
12 25th Ave NE/NW Dwy
13 NE 45th St/S U-Village Dwy
14 NE 45th St/SE QFC Dwy
15 30th Ave NE/NE QFC Dwy
LEGEND
8 PM Peak Hour Traffic Volumes
Note: Access Scenario A assumes unsignalized full access at the SE QFC Driveway on NE 45th St (Intersection #14).
Transportation Engineering NorthWest
Figure 4: 2015 PM Peak Hour Traffic Volumes with Access Scenario A
QFC/ University Village Access Study
February 15, 2005

For Access Scenario B (RIRO only access), the trips that were making an eastbound left-turn into the SE QFC Driveway on NE 45th Street (248 trips) were shifted to be northbound right-turns at the SW and West U-Village Driveways on 25th Avenue NE. The trips that were exiting U-Village as a southbound left-turn onto NE 45th Street from the SE QFC Driveway (38 trips) were shifted to be eastbound right-turns at the NE QFC Driveway on 30th Ave NE. The future year 2015 traffic volumes during the weekday p.m. peak hour with Access Scenario B are illustrated in **Figure 5**.

For Access Scenario C (a new traffic signal), it was assumed that 25 percent of the traffic currently exiting the U-Village site as an eastbound right-turn at the NE QFC Driveway on 30th Ave NE would use the new signal to exit the site as a southbound left-turn at the SE QFC Driveway on NE 45th Street. **Figure 6** illustrates future 2015 traffic volumes during weekday p.m. peak hour conditions with Access Scenario C.

Intersection Operational Analyses

Future intersection levels of service (LOS) were evaluated at study intersections in the year 2015 for the following three access scenarios:

- **Scenario A**: Year 2015 with full access at the SE QFC driveway on NE 45th Street (the same configuration as existing year 2004 conditions)
- **Scenario B**: Year 2015 with right-in, right-out (RIRO) only access at the SE QFC driveway on NE 45th Street
- **Scenario C**: Year 2015 with a new traffic signal at the SE QFC driveway on NE 45th Street

A signal warrant analysis was conducted to determine whether the SE QFC Driveway on NE 45th Street meets signal warrants under existing conditions. The results of the signal warrant analysis show that the SE QFC Driveway meets Warrant 3 (Peak Hour) under existing year 2004 conditions. Therefore, the SE QFC driveway would also meet Warrant 3 in 2015. It is possible that the SE QFC Driveway would also meet Warrant 1 (Eight Hour Vehicular Volume) and Warrant 2 (Four Hour Vehicular Volume) under existing year 2004 conditions, although these warrants were not evaluated in this study. The detailed signal warrant analysis is included in **Appendix C**.

For Access Scenario C, the new traffic signal was assumed to have the same basic timing parameters (cycle length, yellow time, all-red time, etc.) as the traffic signal at NE 45th Street/Montlake Boulevard NE. The green times and the offset were optimized to provide the most efficient timing plan for east/west progression on NE 45th Street. Additionally, it was assumed that a pedestrian crosswalk would be provided across NE 45th Street with the new signal.

The LOS results for all three access scenarios in year 2015 are summarized in **Table 5**.

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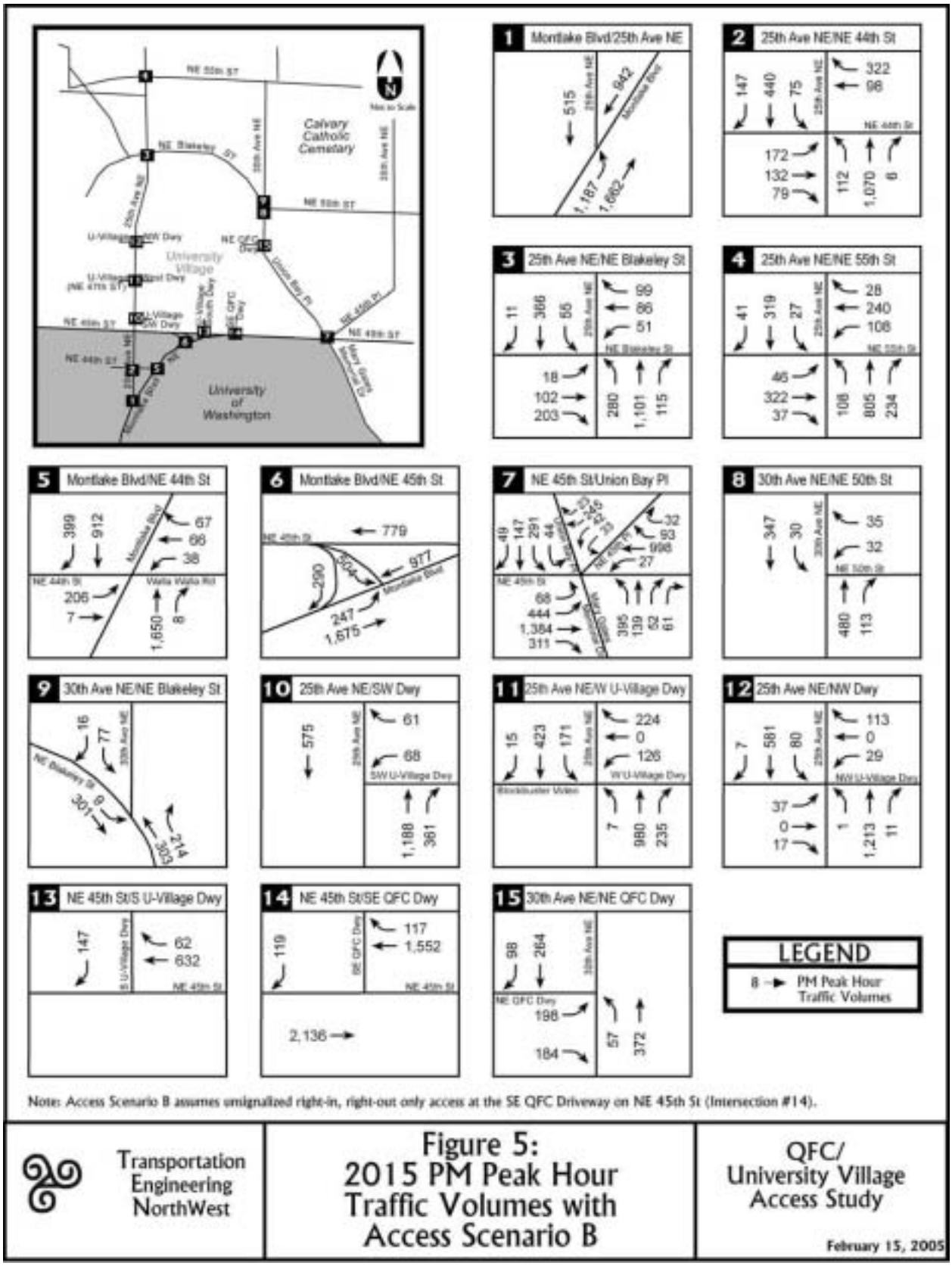


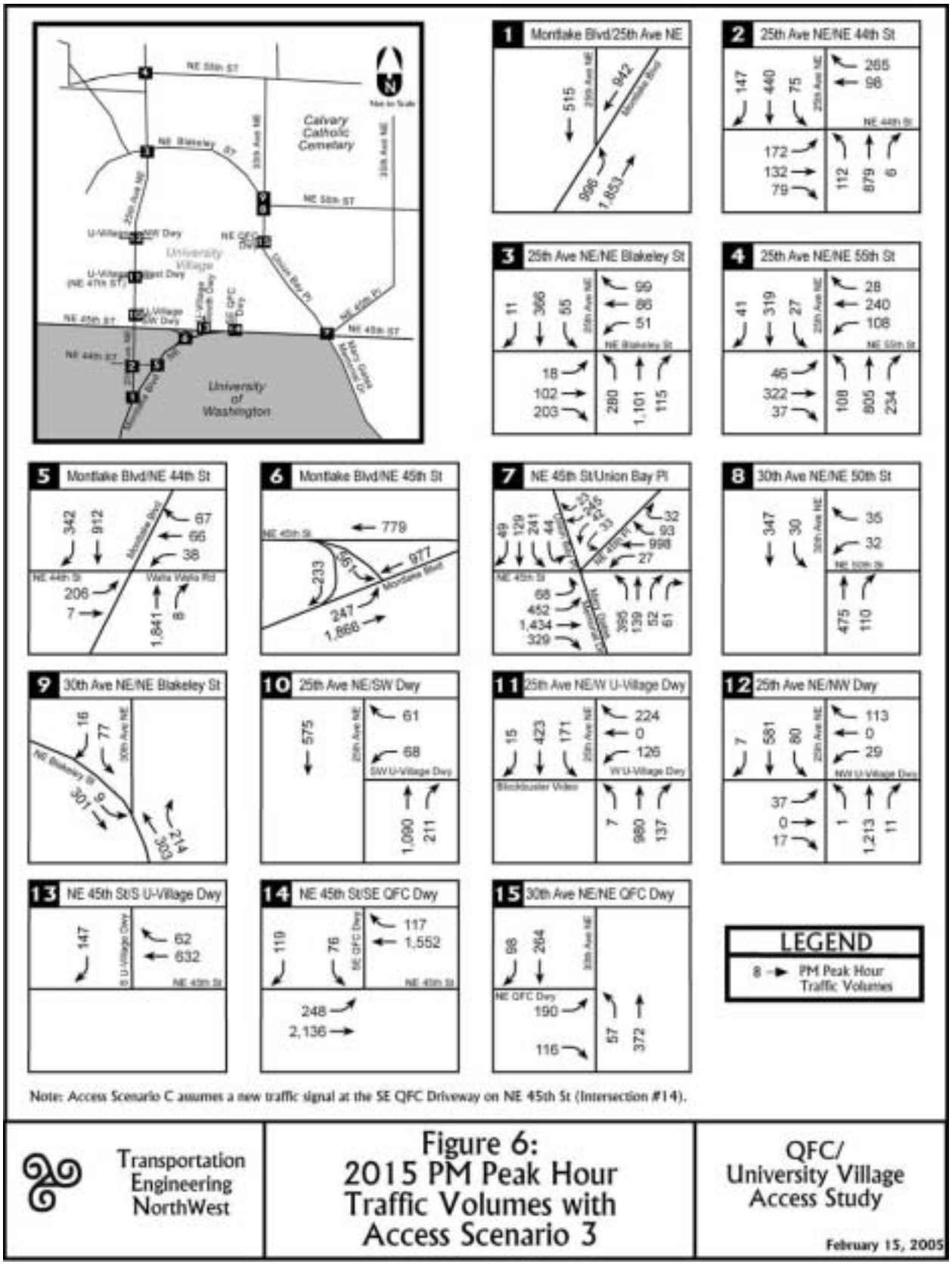
Note: Access Scenario B assumes unsignalized right-in, right-out only access at the SE QFC Driveway on NE 45th St (Intersection #14).

Transportation Engineering NorthWest

Figure 5:
2015 PM Peak Hour Traffic Volumes with Access Scenario B

QFC/ University Village Access Study

February 15, 2005



Note: Access Scenario C assumes a new traffic signal at the SE QFC Driveway on NE 45th St (Intersection #14).

Transportation Engineering NorthWest

Figure 6:
2015 PM Peak Hour
Traffic Volumes with
Access Scenario 3

QFC/
University Village
Access Study

February 15, 2005

Table 5
Year 2015 PM Peak Hour Level of Service Summary

#	Study Intersection	2015 with Access Scenario A (Unsignalized Full Access) LOS[1]	Delay (sec)	V/C[2]	2015 with Access Scenario B (RIRO Only Access) LOS[1]	Delay (sec)	V/C[2]	2015 with Access Scenario C (New Traffic Signal) LOS[1]	Delay (sec)	V/C[2]
	Signalized Intersections									
1	25th Ave NE / Montlake Blvd NE	C	21.1	0.73	C	26.1	0.74	C	20.9	0.73
2	25th Ave NE / NE 44th St	C	34.5	0.64	D	35.6	0.73	C	35.0	0.64
11	25th Ave NE / NE 47th St (West U-Village Dwy)	B	12.2	0.66	B	14.0	0.75	B	12.2	0.66
3	25th Ave NE / NE Blakely St	B	13.3	0.60	B	13.1	0.60	B	13.3	0.60
4	25th Ave NE / NE 55th St	C	22.6	0.78	C	22.6	0.78	C	22.6	0.78
5	NE 44th St / Montlake Blvd NE	C	25.3	0.71	C	20.0	0.65	C	25.2	0.71
6	NE 45th St / Montlake Blvd NE	B	19.1	0.72	C	20.4	0.69	B	14.4	0.72
7	NE 45th St / Union Bay Pl	E	75.0	0.94	E	77.1	0.95	E	75.0	0.94
14	NE 45th St / SE QFC Dwy	--	--	--	--	--	--	C	20.2	0.70
	Stop Controlled Intersections									
8	30th Ave NE / NE 50th St									
	Southbound Left	A	8.9		A	9.0		A	8.9	
	Westbound Left-Right	C	18.1		C	18.2		C	18.1	
9	30th Ave NE / NE Blakeley St									
	Southbound Left-Right	C	17.4		C	17.5		C	17.4	
	Eastbound Left	A	8.6		A	8.6		A	8.6	
10	25th Ave NE / SW U-Village Dwy									
	Westbound Left	C	22.8		C	25.6		C	22.8	
	Westbound Right	A	10.1		A	10.8		B	10.1	
12	25th Ave NE / NW U-Village Dwy									
	Southbound Left	B	13.6		B	13.6		B	13.6	
	Westbound Left	F	59.5		F	59.5		F	59.5	
	Westbound Right	B	12.8		B	12.8		B	12.8	
13	NE 45th St / South U-Village Dwy									
	Southbound Right	C	16.8		C	16.8		C	16.8	
14	NE 45th Street / SE QFC Dwy									
	Southbound Left	E	49.9		--	--		Signalized in Scenario C (See Above)		
	Southbound Right	B	10.6		B	11.3				
	Eastbound Left	D	26.4		--	--				
15	30th Ave NE / NE QFC Dwy									
	Northbound Left	A	8.2		A	8.2		A	8.2	
	Eastbound Left	E	36.4		E	38.4		E	36.4	
	Eastbound Right	B	11.7		B	12.1		B	11.2	

[1] LOS = Level of Service
[2] V/C = Volume/Capacity ratio

As shown in **Table 5**, in 2015, there is little or no change in overall intersection LOS and delay in comparing the three access scenarios.

At the SE QFC Driveway on NE 45th Street, the southbound left-turn is expected to operate at LOS E with an average delay of 49.9 seconds per vehicle in 2015 with Access Scenario A (unsignalized full access). With Access Scenario B, the driveway would become a right-in, right-out only driveway and the southbound right-turn is anticipated to operate at LOS B with an average delay of approximately 11 seconds per vehicle. With a new traffic signal (Access Scenario C), the overall intersection of NE 45th Street/SE QFC Driveway is estimated to operate at LOS C with an average delay of 20.2 seconds per vehicle. Detailed level of service summary worksheets are provided in **Appendix A**.

Queuing Analysis

Existing field observations during the p.m. peak hour showed that eastbound left-turn queue at the SE QFC Driveway on NE 45th Street occasionally exceeds the existing capacity and spills over into the eastbound through travel lane.

A future year queuing analysis was conducted to document the anticipated vehicle queues at the access driveways to University Village during the weekday p.m. peak hour. The queuing analysis was conducted for year 2015 with a new traffic signal at the SE QFC Driveway on NE 45th Street (Access Scenario C). The results of the queuing analysis are summarized in **Table 6**. The detailed queue calculations are included in **Appendix B**.

Table 6
Year 2015 PM Peak Hour Queue Summary

#	Study Intersection	Storage (ft)	95th Percentile Queue Length (ft) 2015 with Access Scenario C (New Traffic Signal)
10	25th Ave NE / SW U-Village Dwy		
	Westbound Left	60	50
	Westbound Right	190	25
11	25th Ave NE / West U-Village Dwy		
	Southbound Left	110+TWLTL[1]	175
	Westbound Left	190	100
	Westbound Right	190	125
12	25th Ave NE / NW U-Village Dwy		
	Southbound Left	TWLTL[1]	25
	Westbound Left	300	50
	Westbound Right	90	25
13	NE 45th St / South U-Village Dwy		
	Southbound Right	120	50
14	NE 45th Street / SE QFC Dwy		
	Southbound Left	150	100
	Southbound Right	80	100
	Eastbound Left	240	275
15	30th Ave NE / NE QFC Dwy		
	Northbound Left	40	25
	Eastbound Left	300	125
	Eastbound Right	85	25

[1] TWLTL = Two-Way Left-Turn Lane

As shown in **Table 6**, all of the 95th percentile queue lengths in 2015 with Access Scenario C (a new traffic signal) are estimated to be accommodated in the existing storage, with the exception of the eastbound left-turn at NE 45th Street/SE QFC Driveway. The eastbound left-turn is estimated to have a 95th percentile queue length of 275 feet with a signal, which would exceed the available storage by approximately 1 vehicle. The average queue for this movement is anticipated to be 200 feet during the weekday p.m. peak hour in 2015.

With Access Scenario C, it appears feasible to extend the eastbound left-turn pocket at the SE QFC Driveway on NE 45th Street by approximately 50 feet, from 240 feet to 290 feet. In order to extend the left-turn pocket, the eastbound through lanes on NE 45th Street (east of the NE 45th St/Montlake Blvd NE intersection) would have to be narrowed from 13 feet each to 11 feet and 12 feet.

As also shown in **Table 6**, the 95th percentile queue length for the southbound right-turn at the SE QFC Driveway is estimated be 100 feet with the new signal in Access Scenario C. Although the storage was measured at 80 feet, approximately 4 vehicles can store in the southbound right-turn lane without blocking access to the adjacent southbound left-turn lane. Therefore the anticipated 100 foot queue would be expected to be accommodated within the existing storage.

With the new traffic signal in Access Scenario C, the 95th percentile queue for the eastbound through movement at the SE QFC Driveway on NE 45th Street is anticipated to be 300 feet during the p.m. peak hour in 2015. This queue would be expected to be accommodated within the existing storage, and would not be expected to extend into the intersection of NE 45th Street/Montlake Blvd NE.

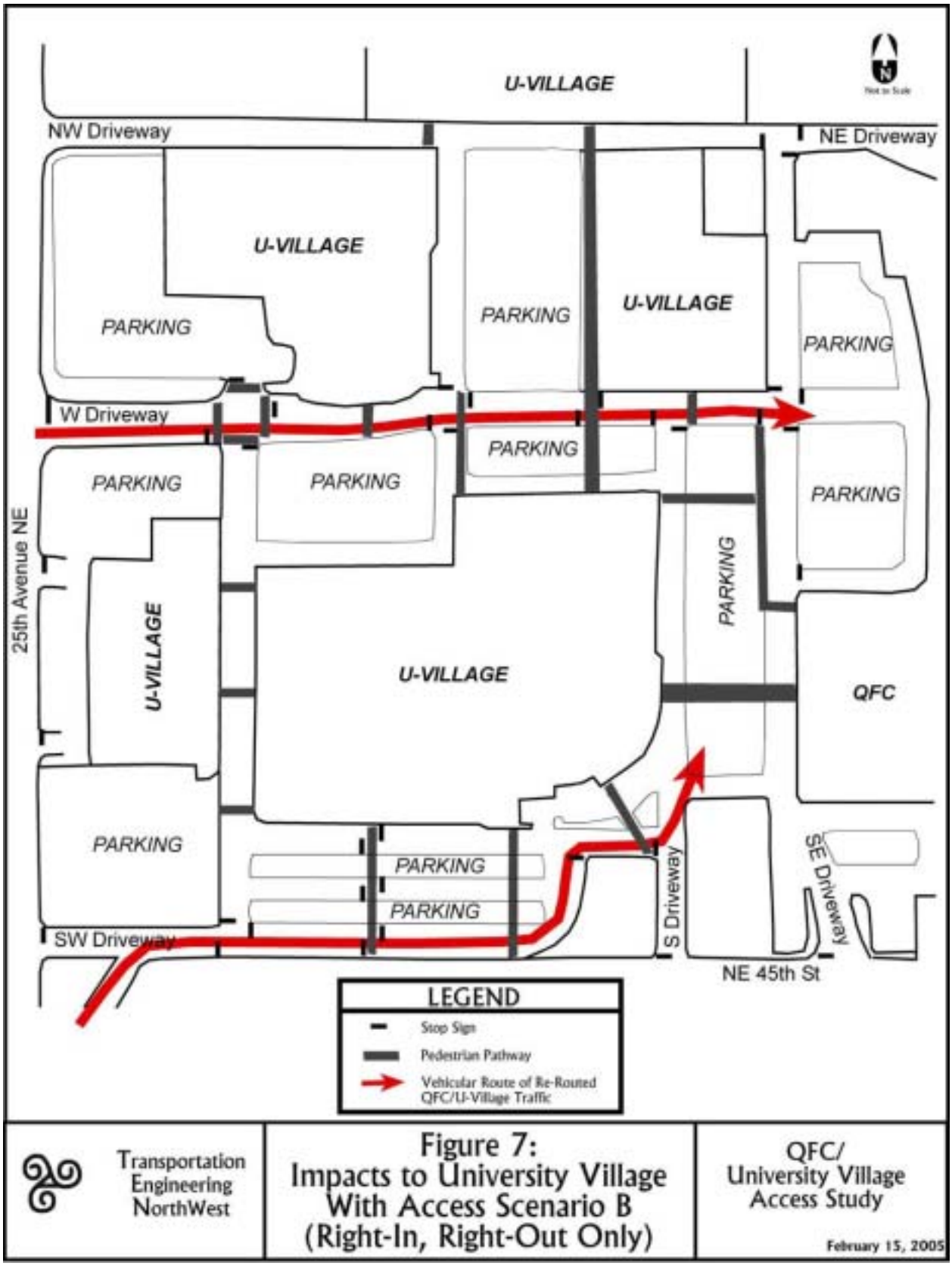
ON-SITE CIRCULATION

The following compares the impacts to circulation on the QFC/University Village site as a result of the three access scenarios.

There would be no expected change in on-site circulation with Access Scenario A (unsignalized full access).

In 2015, there are approximately 250 trips that are expected to enter QFC/U-Village as an eastbound left-turn at the SE QFC Driveway. With Access Scenario B (RIRO only), these trips would be redistributed to be northbound right-turns at the West and Southwest U-Village driveways on 25th Avenue NE. These trips would then have to travel through U-Village and stop at numerous stop signs and pedestrian pathways in order to park their vehicles near the QFC. This would result in an increased potential for conflict between vehicles and pedestrians on the U-Village site. **Figure 7** illustrates the anticipated impacts to University Village as a result of restricting the SE QFC Driveway on NE 45th Street to RIRO only.

For Access Scenario C (a new traffic signal), there would be a small expected change in circulation within the U-Village site. It was estimated that approximately 40 trips that were exiting the U-Village site as an eastbound right-turn at the NE QFC driveway on 30th Avenue NE would use the new signal to exit the site as a southbound left-turn at the SE QFC driveway on NE 45th Street.


U-VILLAGE
NW Driveway
NE Driveway
U-VILLAGE
PARKING
PARKING
U-VILLAGE
PARKING
W Driveway
PARKING
PARKING
PARKING
PARKING
25th Avenue NE
U-VILLAGE
U-VILLAGE
PARKING
QFC
PARKING
PARKING
PARKING
S Driveway
SE Driveway
SW Driveway
NE 45th St
LEGEND
Stop Sign
Pedestrian Pathway
Vehicular Route of Re-Routed QFC/U-Village Traffic
Transportation Engineering NorthWest
Figure 7:
Impacts to University Village
With Access Scenario B
(Right-In, Right-Out Only)
QFC/
University Village
Access Study
February 15, 2005

COMPARISON OF ACCESS SCENARIOS

A summary comparison of the pros and cons for each of the three Access Scenarios is included in **Table 8**. The table compares QFC access, safety, LOS, queuing at access driveways, pedestrians, impacts to U-Village circulation, and adjacent street impacts.

Table 7
Summary Comparison of Access Scenarios at NE 45th Street/SE QFC Driveway

	Access Scenario A (Unsignalized Full Access)	Access Scenario B (Right-In, Right-Out Only)	Access Scenario C (New Traffic Signal)
Pros	*QFC Access:* Full access to QFC from NE 45th St is maintained *Impacts to U-Village Circulation:* None *Adjacent Street Impacts:* None	*Safety:* Potential conflict between Eastbound left-turns into QFC driveway and WB thru traffic on NE 45th St is eliminated	*QFC Access:* Full access to QFC from NE 45th St is maintained *Pedestrians:* Pedestrian crossing of NE 45th St is allowed with new signalized crosswalk *Safety:* Eastbound left-turns into QFC Driveway are protected by signal *Impacts to U-Village Circulation:* Little to none, as it was assumed that 38 trips that were exiting at 30th Ave NE would now exit at the QFC driveway on NE 45th St
Cons	*Pedestrians:* No pedestrian crossing of NE 45th St between Montlake Blvd NE and Union Bay Place *Safety:* Eastbound left-turns into QFC driveway must yield to 3 westbound thru lanes	*QFC Access:* Access to QFC from NE 45th St is restricted to right-in right-out *Pedestrians:* No pedestrian crossing of NE 45th St between Montlake Blvd NE and Union Bay Place *Impacts to U-Village Circulation:* Increased potential for conflict between vehicles and pedestrians with additional 248 trips that were entering as an eastbound left-turn at QFC driveway would have to travel through U-Village to get to QFC *Adjacent Street Impacts:* May create additional U-turns on NE 45th Street for EB traffic wishing to enter at QFC Driveway	*Adjacent Street Impacts:* Traffic on NE 45th Street may experience minor delays at the signal when green time is given to the traffic entering and exiting U-Village.
Neutral	*LOS:* No significant differences in LOS between the three access scenarios *Queuing:* All queues are estimated to be accommodated within the available storage	*LOS:* No significant differences in LOS between the three access scenarios *Queuing:* All queues are estimated to be accommodated within the available storage	*LOS:* No significant differences in LOS between the three access scenarios *Queuing* Assuming the Eastbound left-turn lane can be extended by 50 feet, all queues would be estimated to be accommodated within the available storage

The following briefly summarizes the key pros and cons for each of the three access scenarios:

Access Scenario A – Unsignalized Full Access

With Access Scenario A, full access to QFC/U-Village would be maintained. at the SE QFC Driveway on NE 45th Street. There would also be no impact to circulation on the U-Village site as a result of this access scenario.

There would continue to be a potential for conflict between eastbound left-turns and westbound through traffic on NE 45th Street at the SE QFC Driveway on NE 45th Street with Access Scenario A. Also, with Access Scenario A, there would be no pedestrian crossing of NE 45th Street as would be allowed with Access Scenario C.

Access Scenario B – Right-In, Right-Out (RIRO) Access

With Access Scenario B, access to QFC/U-Village would be restricted to RIRO, eliminating the potential for conflict between eastbound left-turns and westbound through traffic at the SE QFC Driveway on NE 45th Street.

This access restriction is likely to increase the potential for conflict between vehicles and pedestrians on the U-Village site as the approximately 250 p.m. peak hour trips that were entering the driveway would be re-routed to other driveways on 25th Avenue NE. Also, with Access Scenario A, there would be no pedestrian crossing of NE 45th Street as would be allowed with Access Scenario C.

Access Scenario C – New Traffic Signal

With the new traffic signal in Access Scenario C, full access to QFC/U-Village is maintained at the SE QFC driveway on NE 45th Street and the potential for conflict between eastbound left-turns and westbound through traffic is eliminated with a protected left-turn phase. The new signal may also have the positive affect of metering and reducing curb-lane speeds for vehicles traveling westbound on NE 45th Street and destined up the NE 45th Street viaduct which would also improve safety at the intersection.

Although eastbound and westbound through traffic on NE 45th Street may experience minor delays as a result of the new traffic signal, the anticipated 95th percentile queue for the eastbound through movement (300') would not be expected to extend into the intersection of NE 45th Street/Montlake Blvd NE. There would also be little or no impact to circulation with the U-Village site as a result of the new signal in Access Scenario C.

Appendix A:

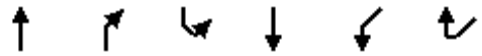
Level of Service Calculations at Study Intersections

2004 Existing PM Peak Hour

Methodology Used in Year 2004 Level of Service Analysis

The Highway Capacity Manual methodology used in the year 2004 level of service analysis is consistent with an article published in the WesternITE Journal entitled *Mysteries of the PHF*, Ransford S McCourt and Dennis Strong, November-December 2002. The article discusses the mysteries associated with the Highway Capacity Manual's recommendations about how to use peak hour factors. It also outlines some basic 'how to's" associated with appropriate methods for applying peak hour factors for signalized and unsignalized capacity analysis.

This method establishes the peak 15-minute period of the overall intersection, and then takes those peak 15-minute traffic volumes by movement and multiplies them by 4. In this case, the peak hour factor (PHF) is equal to 1.0. This method was only applied to intersections with existing 2004 traffic counts.



Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.88		0.95	0.97	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	1.00	1.00		1.00	0.95	
Satd. Flow (prot)	3574	2814		3471	3433	
Flt Permitted	1.00	1.00		1.00	0.95	
Satd. Flow (perm)	3574	2814		3471	3433	
Volume (vph)	828	1728	0	472	848	0
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	828	1728	0	472	848	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	828	1728	0	472	848	0
Heavy Vehicles (%)	1%	1%	4%	4%	2%	2%
Turn Type	Prot					
Protected Phases	2	1 2		2	1	
Permitted Phases						
Actuated Green, G (s)	43.0	120.0		43.0	67.0	
Effective Green, g (s)	44.0	120.0		44.0	68.0	
Actuated g/C Ratio	0.37	1.00		0.37	0.57	
Clearance Time (s)	5.0			5.0	5.0	
Lane Grp Cap (vph)	1310	2814		1273	1945	
v/s Ratio Prot	0.23	c0.61		0.14	0.25	
v/s Ratio Perm						
v/c Ratio	0.63	0.61		0.37	0.44	
Uniform Delay, d1	31.3	0.0		27.9	15.0	
Progression Factor	1.00	1.00		1.29	1.74	
Incremental Delay, d2	2.3	1.0		0.8	0.6	
Delay (s)	33.7	1.0		36.8	26.6	
Level of Service	C	A		D	C	
Approach Delay (s)	11.6			36.8	26.6	
Approach LOS	B			D	C	

Intersection Summary			
HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	0.0
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99			0.92		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95			0.88		1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1656	3107			2871		1787	3562		1787	3382	
Flt Permitted	0.41	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	721	3107			2871		1787	3562		1787	3382	
Volume (vph)	196	136	64	0	72	252	68	844	16	60	404	140
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	196	136	64	0	72	252	68	844	16	60	404	140
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	196	200	0	0	324	0	68	860	0	60	544	0
Confl. Peds. (#/hr)			16			50			15			25
Heavy Vehicles (%)	9%	9%	9%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt						Prot			Prot		
Protected Phases	3	8			4		5	2		1	6	
Permitted Phases	8											
Actuated Green, G (s)	41.5	41.5			31.0		19.0	45.0		19.0	45.0	
Effective Green, g (s)	42.0	42.0			32.0		20.0	46.0		20.0	46.0	
Actuated g/C Ratio	0.35	0.35			0.27		0.17	0.38		0.17	0.38	
Clearance Time (s)	3.0	4.5			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	299	1087			766		298	1365		298	1296	
v/s Ratio Prot	c0.03	0.06			0.11		0.04	c0.24		0.03	c0.16	
v/s Ratio Perm	c0.20											
v/c Ratio	0.66	0.18			0.42		0.23	0.63		0.20	0.42	
Uniform Delay, d1	33.0	27.1			36.4		43.3	30.1		43.1	27.2	
Progression Factor	1.00	1.00			0.67		1.14	1.20		1.00	1.00	
Incremental Delay, d2	10.7	0.4			1.5		1.5	1.8		1.5	1.0	
Delay (s)	43.7	27.5			25.9		50.8	37.9		44.6	28.2	
Level of Service	D	C			C		D	D		D	C	
Approach Delay (s)		35.5			25.9			38.8			29.8	
Approach LOS		D			C			D			C	

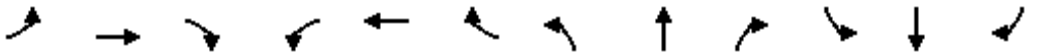
Intersection Summary			
HCM Average Control Delay	34.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.65		0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.92		0.99	1.00		0.99	1.00	
Frt		1.00	0.85		0.94		1.00	0.98		1.00	0.99	
Flt Protected		0.99	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1861	1033		1576		1778	3462		1749	3495	
Flt Permitted		0.93	1.00		0.88		0.54	1.00		0.21	1.00	
Satd. Flow (perm)		1743	1033		1403		1017	3462		386	3495	
Volume (vph)	24	124	172	72	68	120	240	876	128	36	320	24
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	24	124	172	72	68	120	240	876	128	36	320	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	148	172	0	260	0	240	1004	0	36	344	0
Confl. Peds. (#/hr)	23		455	455		23	3		28	28		3
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2		2	2			1			1		
Actuated Green, G (s)		27.0	27.0		27.0		42.0	42.0		42.0	42.0	
Effective Green, g (s)		29.0	29.0		29.0		43.0	43.0		43.0	43.0	
Actuated g/C Ratio		0.36	0.36		0.36		0.54	0.54		0.54	0.54	
Clearance Time (s)		6.0	6.0		6.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		632	374		509		547	1861		207	1879	
v/s Ratio Prot								c0.29			0.10	
v/s Ratio Perm		0.08	0.17		c0.19		0.24			0.09		
v/c Ratio		0.23	0.46		0.51		0.44	0.54		0.17	0.18	
Uniform Delay, d1		17.8	19.5		20.0		11.2	12.1		9.4	9.5	
Progression Factor		1.00	1.00		1.00		0.69	0.68		0.78	0.75	
Incremental Delay, d2		0.9	4.0		3.6		2.4	1.0		1.7	0.2	
Delay (s)		18.6	23.5		23.6		10.0	9.2		9.1	7.3	
Level of Service		B	C		C		B	A		A	A	
Approach Delay (s)		21.3			23.6			9.4			7.5	
Approach LOS		C			C			A			A	

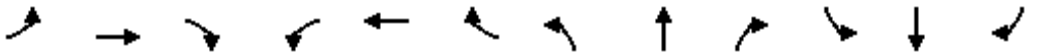
Intersection Summary			
HCM Average Control Delay	12.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			5%			-5%	
Total Lost time (s)		4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor		1.00			1.00	1.00		0.95			0.95	
Frpb, ped/bikes		1.00			1.00	0.90		0.98			0.99	
Flpb, ped/bikes		0.99			0.99	1.00		1.00			1.00	
Frt		0.99			1.00	0.85		0.97			0.99	
Flt Protected		0.99			0.98	1.00		1.00			1.00	
Satd. Flow (prot)		1834			1824	1447		3248			3522	
Flt Permitted		0.91			0.71	1.00		0.86			0.86	
Satd. Flow (perm)		1674			1314	1447		2806			3031	
Volume (vph)	52	280	20	144	216	32	92	708	196	28	344	40
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	52	280	20	144	216	32	92	708	196	28	344	40
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	352	0	0	360	32	0	996	0	0	412	0
Confl. Peds. (#/hr)	53		40	40		53	36		36	36		36
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2		2	1			1		
Actuated Green, G (s)		35.0			35.0	35.0		35.0			35.0	
Effective Green, g (s)		36.0			36.0	36.0		36.0			36.0	
Actuated g/C Ratio		0.45			0.45	0.45		0.45			0.45	
Clearance Time (s)		5.0			5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)		753			591	651		1263			1364	
v/s Ratio Prot												
v/s Ratio Perm		0.21			c0.27	0.02		c0.35			0.14	
v/c Ratio		0.47			0.61	0.05		0.79			0.30	
Uniform Delay, d1		15.3			16.7	12.4		18.8			14.0	
Progression Factor		1.00			1.00	1.00		0.56			1.00	
Incremental Delay, d2		2.1			4.6	0.1		4.4			0.6	
Delay (s)		17.4			21.3	12.5		14.8			14.6	
Level of Service		B			C	B		B			B	
Approach Delay (s)		17.4			20.6			14.8			14.6	
Approach LOS		B			C			B			B	

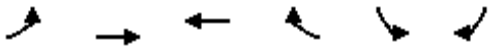
Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.1%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor	0.95	0.95			0.95	1.00		0.95			0.95	
Frpb, ped/bikes	1.00	1.00			1.00	1.00		1.00			0.99	
Flpb, ped/bikes	1.00	1.00			0.97	1.00		1.00			1.00	
Frt	1.00	1.00			1.00	0.85		1.00			0.96	
Flt Protected	0.95	0.95			0.98	1.00		1.00			1.00	
Satd. Flow (prot)	1633	1641			3383	1599		3573			3308	
Flt Permitted	0.65	0.67			0.79	1.00		1.00			1.00	
Satd. Flow (perm)	1123	1146			2741	1599		3573			3308	
Volume (vph)	152	4	0	76	80	60	0	1952	4	0	776	308
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	152	4	0	76	80	60	0	1952	4	0	776	308
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	76	80	0	0	156	60	0	1956	0	0	1084	0
Confl. Peds. (#/hr)				35								16
Heavy Vehicles (%)	5%	5%	5%	1%	1%	1%	1%	1%	1%	3%	3%	3%
Turn Type	Perm			Perm		Perm						
Protected Phases		2			2			1			1	
Permitted Phases	2			2		2						
Actuated Green, G (s)	42.0	42.0			42.0	42.0		68.0			68.0	
Effective Green, g (s)	43.0	43.0			43.0	43.0		69.0			69.0	
Actuated g/C Ratio	0.36	0.36			0.36	0.36		0.57			0.57	
Clearance Time (s)	5.0	5.0			5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)	402	411			982	573		2054			1902	
v/s Ratio Prot								c0.55			0.33	
v/s Ratio Perm	0.07	c0.07			0.06	0.04						
v/c Ratio	0.19	0.19			0.16	0.10		0.95			0.57	
Uniform Delay, d1	26.5	26.6			26.2	25.7		24.0			16.1	
Progression Factor	1.41	1.40			1.00	1.00		1.00			0.46	
Incremental Delay, d2	1.0	1.0			0.3	0.4		10.1			1.2	
Delay (s)	38.4	38.2			26.5	26.0		34.1			8.6	
Level of Service	D	D			C	C		C			A	
Approach Delay (s)		38.3			26.4			34.1			8.6	
Approach LOS		D			C			C			A	

Intersection Summary			
HCM Average Control Delay	25.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		0%	0%		-10%	
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		0.97	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1787	3574	3505		3640	1679
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1787	3574	3505		3640	1679
Volume (vph)	232	1504	620	0	616	228
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	232	1504	620	0	616	228
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	232	1504	620	0	616	228
Heavy Vehicles (%)	1%	1%	3%	3%	1%	1%
Turn Type	Prot					Perm
Protected Phases	2	6	1		3	
Permitted Phases						3
Actuated Green, G (s)	21.0	81.0	55.0		29.0	29.0
Effective Green, g (s)	22.0	82.0	56.0		30.0	30.0
Actuated g/C Ratio	0.18	0.68	0.47		0.25	0.25
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	328	2442	1636		910	420
v/s Ratio Prot	c0.13	c0.42	0.18		c0.17	
v/s Ratio Perm						0.14
v/c Ratio	0.71	0.62	0.38		0.68	0.54
Uniform Delay, d1	46.0	10.4	20.7		40.6	39.0
Progression Factor	0.68	0.07	1.00		1.00	1.00
Incremental Delay, d2	5.8	0.5	0.7		4.0	5.0
Delay (s)	36.9	1.3	21.4		44.7	44.0
Level of Service	D	A	C		D	D
Approach Delay (s)		6.0	21.4		44.5	
Approach LOS		A	C		D	

Intersection Summary			
HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			0%			-5%				0%		
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0		
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.91			0.91	0.91		
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00		
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	1.00			1.00	1.00		
Frt	1.00	1.00	1.00	0.85	1.00	0.99			1.00	0.98		
Flt Protected	0.95	0.95	1.00	1.00	0.95	1.00			0.95	0.98		
Satd. Flow (prot)	1787	1787	3574	1599	1803	5138			1626	3269		
Flt Permitted	0.18	0.95	1.00	1.00	0.13	1.00			0.95	0.98		
Satd. Flow (perm)	336	1787	3574	1599	248	5138			1626	3269		
Volume (vph)	56	408	1400	280	16	832	72	16	188	88	12	16
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	56	408	1400	280	16	832	72	16	188	88	12	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	56	408	1400	280	16	920	0	0	101	203	0	0
Confl. Peds. (#/hr)					22							15
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%	2%	2%	1%	1%	1%	1%
Turn Type	custom	Prot		Perm	Perm				Split			
Protected Phases		1	6			2			4	4		
Permitted Phases	1			6	2							
Actuated Green, G (s)	21.4	21.4	56.0	56.0	29.6	29.6			12.8	12.8		
Effective Green, g (s)	22.4	22.4	57.0	57.0	30.6	30.6			13.8	13.8		
Actuated g/C Ratio	0.19	0.19	0.49	0.49	0.26	0.26			0.12	0.12		
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	65	343	1747	782	65	1348			192	387		
v/s Ratio Prot		c0.23	c0.39			0.18			c0.06	0.06		
v/s Ratio Perm	0.17			0.18	0.06							
v/c Ratio	0.86	1.19	0.80	0.36	0.25	0.68			0.53	0.52		
Uniform Delay, d1	45.6	47.1	25.0	18.5	33.9	38.6			48.3	48.3		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00		
Incremental Delay, d2	65.3	110.7	4.0	1.3	8.8	2.8			2.6	1.3		
Delay (s)	110.9	157.8	29.0	19.7	42.7	41.5			50.9	49.6		
Level of Service	F	F	C	B	D	D			D	D		
Approach Delay (s)			54.4			41.5				50.0		
Approach LOS			D			D				D		

Intersection Summary			
HCM Average Control Delay	50.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	116.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	101.2%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBL2	SBL	SBT	SBR	SWL2	SWL	SWR	SWR2
Lane Configurations								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			0%			0%		
Total Lost time (s)		4.0	4.0			4.0	4.0	
Lane Util. Factor		0.95	0.95			1.00	0.88	
Frpb, ped/bikes		1.00	0.99			1.00	0.94	
Flpb, ped/bikes		1.00	1.00			1.00	1.00	
Frt		1.00	0.97			1.00	0.85	
Flt Protected		0.95	0.99			0.95	1.00	
Satd. Flow (prot)		1698	1707			1787	2653	
Flt Permitted		0.95	0.99			0.95	1.00	
Satd. Flow (perm)		1698	1707			1787	2653	
Volume (vph)	40	280	140	44	20	40	240	16
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	40	280	140	44	20	40	240	16
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	251	253	0	0	60	256	0
Confl. Peds. (#/hr)				18				76
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Split	Split			Split		pm+ov	
Protected Phases	3	3	3		8	8	1	
Permitted Phases							8	
Actuated Green, G (s)		21.2	21.2			6.6	28.0	
Effective Green, g (s)		22.2	22.2			7.6	30.0	
Actuated g/C Ratio		0.19	0.19			0.07	0.26	
Clearance Time (s)		5.0	5.0			5.0	5.0	
Vehicle Extension (s)		3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)		323	325			116	774	
v/s Ratio Prot		0.15	c0.15			c0.03	0.06	
v/s Ratio Perm							0.03	
v/c Ratio		0.78	0.78			0.52	0.33	
Uniform Delay, d1		44.8	44.9			52.7	35.2	
Progression Factor		1.00	1.00			1.00	1.00	
Incremental Delay, d2		11.2	11.2			3.9	0.3	
Delay (s)		56.0	56.0			56.6	35.4	
Level of Service		E	E			E	D	
Approach Delay (s)			56.0			39.4		
Approach LOS			E			D		

Intersection Summary

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#8 NE 50th St & 30th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/1/2004*	Analysis Year	*2004 Existing PM Peak*
Analysis Time Period	*5:00 pm*		
Project Description	*QFC U-Village Access Study #2400*		
East/West Street:	*NE 50th St*	North/South Street:	*30th Ave NE*
Intersection Orientation:	*North-South*	Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*0*	*460*	*104*	*24*	*328*	*0*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*0*	*460*	*104*	*24*	*328*	*0*
Percent Heavy Vehicles	*0*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*12*	*0*	*36*	*0*	*0*	*0*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*12*	*0*	*36*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*-10*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (vph)		*24*		*48*				
C (m) (vph)		*1007*		*464*				
v/c		*0.02*		*0.10*				
95% queue length		*0.07*		*0.34*				
Control Delay		*8.7*		*13.7*				
LOS		*A*		*B*				
Approach Delay	--	--	*13.7*					
Approach LOS	--	--	*B*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#9 NE Blakeley & 30th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/1/2004*	Analysis Year	*2004 Existing PM Peak*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study #2400*
East/West Street: *NE Blakeley St*	North/South Street: *30th Ave NE*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*4*	*292*		*0*	*300*	*200*
Peak-hour factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate (veh/h)	*4*	*292*	*0*	*0*	*300*	*200*
Proportion of heavy vehicles, P_{HV}	*1*	--	--	*0*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*60*	*0*	*16*
Peak-hour factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*60*	*0*	*16*
Proportion of heavy vehicles, P_{HV}	*0*	*1*	*0*	*0*	*1*	*1*
Percent grade (%)		*0*			*-10*	
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
Volume, v (vph)	*4*						*76*	
Capacity, c_m (vph)	*1069*						*443*	
v/c ratio	*0.00*						*0.17*	
Queue length (95%)	*0.01*						*0.61*	
Control Delay (s/veh)	*8.4*						*14.8*	
LOS	*A*						*B*	
Approach delay (s/veh)	--	--				*14.8*		
Approach LOS	--	--				*B*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#10 SW Dwy & 25th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/15/2004*	Analysis Year	*2004 Existing PM peak*
Analysis Time Period	*5:00 pm*		

Project Description *QFC U-Village Access Study - #2400*

East/West Street: *SW U-Village Dwy*	North/South Street: *25th Ave NE*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

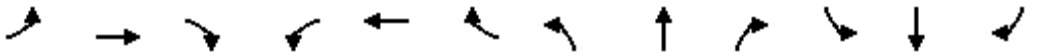
Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*0*	*1000*	*260*	*0*	*492*	*0*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*0*	*1000*	*260*	*0*	*492*	*0*
Percent Heavy Vehicles	*0*	--	--	*1*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*		*T*	
Upstream Signal		*1*			*1*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*76*	*0*	*48*	*0*	*0*	*0*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*76*	*0*	*48*	*0*	*0*	*0*
Percent Heavy Vehicles	*3*	*0*	*3*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration			*L*		*R*			
v (vph)			*76*		*48*			
C (m) (vph)			*319*		*798*			
v/c			*0.24*		*0.06*			
95% queue length			*0.91*		*0.19*			
Control Delay			*19.8*		*9.8*			
LOS			*C*		*A*			
Approach Delay	--	--	*15.9*					
Approach LOS	--	--	*C*					



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				1.00		1.00	1.00	0.95		1.00	1.00	
Frpb, ped/bikes				1.00		0.88	1.00	0.99		1.00	1.00	
Flpb, ped/bikes				1.00		1.00	0.96	1.00		0.99	1.00	
Frt				1.00		0.85	1.00	0.97		1.00	0.99	
Flt Protected				0.95		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1787		1413	1699	3393		1751	1848	
Flt Permitted				0.95		1.00	0.52	1.00		0.23	1.00	
Satd. Flow (perm)				1787		1413	931	3393		430	1848	
Volume (vph)	0	0	0	148	0	244	4	844	192	200	340	12
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	0	0	148	0	244	4	844	192	200	340	12
RTOR Reduction (vph)	0	0	0	0	0	133	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	148	0	111	4	1036	0	200	352	0
Confl. Peds. (#/hr)						80	35		28	28		35
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type				Prot		custom	Perm			Perm		
Protected Phases				2				1			1	
Permitted Phases						2	1			1		
Actuated Green, G (s)				19.0		19.0	51.0	51.0		51.0	51.0	
Effective Green, g (s)				20.0		20.0	52.0	52.0		52.0	52.0	
Actuated g/C Ratio				0.25		0.25	0.65	0.65		0.65	0.65	
Clearance Time (s)				5.0		5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)				447		353	605	2205		280	1201	
v/s Ratio Prot				c0.08				0.31			0.19	
v/s Ratio Perm						0.08	0.00			c0.47		
v/c Ratio				0.33		0.32	0.01	0.47		0.71	0.29	
Uniform Delay, d1				24.5		24.4	4.9	7.1		9.1	6.1	
Progression Factor				1.00		1.00	1.00	1.00		0.81	0.39	
Incremental Delay, d2				2.0		2.3	0.0	0.7		14.2	0.6	
Delay (s)				26.5		26.8	4.9	7.8		21.6	3.0	
Level of Service				C		C	A	A		C	A	
Approach Delay (s)		0.0			26.7			7.8			9.7	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#12 NW U-Vil Dwy & 25th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/15/2004*	Analysis Year	*2004 Existing PM Peak*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study - #2400*
East/West Street: *NW U-Village Dwy*	North/South Street: *25th Ave NE*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*0*	*1104*	*12*	*84*	*492*	*4*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*0*	*1104*	*12*	*84*	*492*	*4*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*1*	*0*
Configuration	*L*	*T*	*TR*	*L*		*TR*
Upstream Signal		*1*			*1*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*44*	*0*	*132*	*24*	*0*	*36*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*44*	*0*	*132*	*24*	*0*	*36*
Percent Heavy Vehicles	*1*	*1*	*1*	*2*	*2*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*1*	*0*
Configuration	*L*		*R*		*LTR*	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*	*L*		*R*		*LTR*	
v (vph)	*0*	*84*	*44*		*132*		*60*	
C (m) (vph)	*919*	*586*	*125*		*599*		*320*	
v/c	*0.00*	*0.14*	*0.35*		*0.22*		*0.19*	
95% queue length	*0.00*	*0.50*	*1.43*		*0.84*		*0.68*	
Control Delay	*8.9*	*12.2*	*48.7*		*12.7*		*18.8*	
LOS	*A*	*B*	*E*		*B*		*C*	
Approach Delay	--	--	*21.7*			*18.8*		
Approach LOS	--	--	*C*			*C*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#13 NE 45th St & S (RIRO) Dwy*
Agency/Co.		Jurisdiction	
Date Performed	*11/1/2004*	Analysis Year	*2004 Existing PM Peak*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study - #2400*
East/West Street: *NE 45th St*	North/South Street: *South RIRO Driveway*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*0*	*648*	*84*
Peak-hour factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*0*	*648*	*84*
Proportion of heavy vehicles, P_{HV}	*2*	--	--	*0*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration						*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*0*	*0*	*120*
Peak-hour factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*0*	*0*	*120*
Proportion of heavy vehicles, P_{HV}	*0*	*0*	*0*	*1*	*0*	*1*
Percent grade (%)		*0*			*0*	
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
Volume, v (vph)								*120*
Capacity, c_m (vph)								*444*
v/c ratio								*0.27*
Queue length (95%)								*1.08*
Control Delay (s/veh)								*16.1*
LOS								*C*
Approach delay (s/veh)	--	--				*16.1*		
Approach LOS	--	--				*C*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#14 NE 45th St & SE QFC Dwy*
Agency/Co.		Jurisdiction	
Date Performed	*12/7/2004*	Analysis Year	*2004 Existing PM*
Analysis Time Period	*5:00 pm*		

Project Description *QFC U-Village Access Study - #2400*

East/West Street: *NE 45th Street* | North/South Street: *SE QFC Dwy*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*292*	*1872*	*0*	*0*	*1256*	*108*
Peak-hour factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate (veh/h)	*292*	*1872*	*0*	*0*	*1256*	*108*
Proportion of heavy vehicles, P_{HV}	*2*	--	--	*0*	--	--
Median type	*Raised curb*					
RT Channelized?			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration	*LT*	*T*			*T*	*TR*
Upstream Signal		*1*			*1*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*40*	*0*	*96*
Peak-hour factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*40*	*0*	*96*
Proportion of heavy vehicles, P_{HV}	*0*	*0*	*0*	*1*	*0*	*1*
Percent grade (%)		*0*			*0*	
Flared approach		*N*			*N*	
Storage		*0*			*3*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*					*L*		*R*
Volume, v (vph)	*292*					*40*		*96*
Capacity, c_m (vph)	*581*					*141*		*801*
v/c ratio	*0.50*					*0.28*		*0.12*
Queue length (95%)	*2.81*					*1.09*		*0.41*
Control Delay (s/veh)	*17.3*					*40.3*		*10.1*
LOS	*C*					*E*		*B*
Approach delay (s/veh)	--	--				*19.0*		
Approach LOS	--	--				*C*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#15 NE QFC Dwy & 30th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/1/2004*	Analysis Year	*2004 Existing PM peak*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study #2400*
East/West Street: *NE QFC Driveway*	North/South Street: *30th Ave NE*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*40*	*332*	*0*	*0*	*280*	*64*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*40*	*332*	*0*	*0*	*280*	*64*
Percent Heavy Vehicles	*1*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*1*	*0*	*0*	*1*	*0*
Configuration	*L*	*T*				*TR*
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*0*	*0*	*0*	*232*	*0*	*152*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*0*	*0*	*0*	*232*	*0*	*152*
Percent Heavy Vehicles	*0*	*0*	*0*	*1*	*0*	*1*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*					*L*		*R*
v (vph)	*40*					*232*		*152*
C (m) (vph)	*1215*					*378*		*726*
v/c	*0.03*					*0.61*		*0.21*
95% queue length	*0.10*					*3.92*		*0.79*
Control Delay	*8.1*					*28.5*		*11.3*
LOS	*A*					*D*		*B*
Approach Delay	--	--				*21.7*		
Approach LOS	--	--				*C*		

2015 with Access Scenario A
PM Peak Hour

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.88		0.95	0.97	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	1.00	1.00		1.00	0.95	
Satd. Flow (prot)	3574	2814		3471	3433	
Flt Permitted	1.00	1.00		1.00	0.95	
Satd. Flow (perm)	3574	2814		3471	3433	
Volume (vph)	996	1853	0	515	942	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1038	1930	0	536	981	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1038	1930	0	536	981	0
Heavy Vehicles (%)	1%	1%	4%	4%	2%	2%
Turn Type	Prot					
Protected Phases	2	1 2		2	1	
Permitted Phases						
Actuated Green, G (s)	43.0	120.0		43.0	67.0	
Effective Green, g (s)	44.0	120.0		44.0	68.0	
Actuated g/C Ratio	0.37	1.00		0.37	0.57	
Clearance Time (s)	5.0			5.0	5.0	
Lane Grp Cap (vph)	1310	2814		1273	1945	
v/s Ratio Prot	c0.29	c0.69		0.15	0.29	
v/s Ratio Perm						
v/c Ratio	0.79	0.69		0.42	0.50	
Uniform Delay, d1	33.9	0.0		28.5	15.8	
Progression Factor	1.00	1.00		1.38	1.89	
Incremental Delay, d2	5.0	1.4		0.9	0.7	
Delay (s)	38.9	1.4		40.3	30.5	
Level of Service	D	A		D	C	
Approach Delay (s)	14.5			40.3	30.5	
Approach LOS	B			D	C	

Intersection Summary			
HCM Average Control Delay	21.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98			0.92		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94			0.89		1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1656	3073			2910		1787	3570		1787	3388	
Flt Permitted	0.36	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	629	3073			2910		1787	3570		1787	3388	
Volume (vph)	172	132	79	0	98	265	112	879	6	75	440	147
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	183	140	84	0	104	282	119	935	6	80	468	156
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	183	224	0	0	386	0	119	941	0	80	624	0
Confl. Peds. (#/hr)			16			50			15			25
Heavy Vehicles (%)	9%	9%	9%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt						Prot			Prot		
Protected Phases	3	8			4		5	2		1	6	
Permitted Phases	8											
Actuated Green, G (s)	41.5	41.5			31.0		19.0	45.0		19.0	45.0	
Effective Green, g (s)	42.0	42.0			32.0		20.0	46.0		20.0	46.0	
Actuated g/C Ratio	0.35	0.35			0.27		0.17	0.38		0.17	0.38	
Clearance Time (s)	3.0	4.5			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	272	1076			776		298	1369		298	1299	
v/s Ratio Prot	c0.03	0.07			0.13		0.07	c0.26		0.04	c0.18	
v/s Ratio Perm	c0.20											
v/c Ratio	0.67	0.21			0.50		0.40	0.69		0.27	0.48	
Uniform Delay, d1	33.1	27.3			37.2		44.6	31.0		43.6	28.0	
Progression Factor	1.00	1.00			0.69		1.10	1.14		1.00	1.00	
Incremental Delay, d2	12.5	0.4			1.8		2.4	1.7		2.2	1.3	
Delay (s)	45.6	27.8			27.7		51.4	37.1		45.8	29.2	
Level of Service	D	C			C		D	D		D	C	
Approach Delay (s)		35.8			27.7			38.7			31.1	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM Average Control Delay	34.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.65		0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.94		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.94		1.00	0.98		1.00	1.00	
Flt Protected		0.99	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1862	1033		1618		1778	3484		1770	3522	
Flt Permitted		0.94	1.00		0.91		0.51	1.00		0.16	1.00	
Satd. Flow (perm)		1762	1033		1496		956	3484		289	3522	
Volume (vph)	18	102	203	51	86	99	280	1011	115	55	366	11
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	19	106	211	53	90	103	292	1053	120	57	381	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	125	211	0	246	0	292	1173	0	57	392	0
Confl. Peds. (#/hr)	23		455	455		23	3		28	28		3
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2		2	2			1			1		
Actuated Green, G (s)		27.0	27.0		27.0		42.0	42.0		42.0	42.0	
Effective Green, g (s)		29.0	29.0		29.0		43.0	43.0		43.0	43.0	
Actuated g/C Ratio		0.36	0.36		0.36		0.54	0.54		0.54	0.54	
Clearance Time (s)		6.0	6.0		6.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		639	374		542		514	1873		155	1893	
v/s Ratio Prot								c0.34			0.11	
v/s Ratio Perm		0.07	c0.20		0.16		0.31			0.20		
v/c Ratio		0.20	0.56		0.45		0.57	0.63		0.37	0.21	
Uniform Delay, d1		17.5	20.4		19.5		12.3	12.9		10.7	9.6	
Progression Factor		1.00	1.00		1.00		0.70	0.69		1.09	0.81	
Incremental Delay, d2		0.7	6.0		2.7		4.1	1.5		6.2	0.2	
Delay (s)		18.2	26.5		22.2		12.7	10.3		17.8	8.1	
Level of Service		B	C		C		B	B		B	A	
Approach Delay (s)		23.4			22.2			10.8			9.3	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	13.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

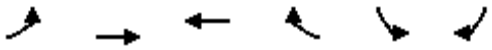
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			5%			-5%	
Total Lost time (s)		4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor		1.00			1.00	1.00		0.95			0.95	
Frpb, ped/bikes		0.99			1.00	0.90		0.98			0.99	
Flpb, ped/bikes		1.00			0.99	1.00		1.00			1.00	
Frt		0.99			1.00	0.85		0.97			0.98	
Flt Protected		0.99			0.98	1.00		1.00			1.00	
Satd. Flow (prot)		1827			1839	1447		3241			3517	
Flt Permitted		0.93			0.74	1.00		0.85			0.79	
Satd. Flow (perm)		1703			1381	1447		2775			2790	
Volume (vph)	46	322	37	108	240	28	108	805	234	27	319	41
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	48	339	39	114	253	29	114	847	246	28	336	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	426	0	0	367	29	0	1207	0	0	407	0
Confl. Peds. (#/hr)	53		40	40		53	36		36	36		36
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2		2	1			1		
Actuated Green, G (s)		35.0			35.0	35.0		35.0			35.0	
Effective Green, g (s)		36.0			36.0	36.0		36.0			36.0	
Actuated g/C Ratio		0.45			0.45	0.45		0.45			0.45	
Clearance Time (s)		5.0			5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)		766			621	651		1249			1256	
v/s Ratio Prot												
v/s Ratio Perm		0.25			c0.27	0.02		c0.44			0.15	
v/c Ratio		0.56			0.59	0.04		0.97			0.32	
Uniform Delay, d1		16.1			16.5	12.3		21.4			14.2	
Progression Factor		1.00			1.00	1.00		0.52			1.00	
Incremental Delay, d2		2.9			4.1	0.1		16.2			0.7	
Delay (s)		19.0			20.6	12.5		27.3			14.9	
Level of Service		B			C	B		C			B	
Approach Delay (s)		19.0			20.0			27.3			14.9	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	100.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor	0.95	0.95			0.95	1.00		0.95			0.95	
Frpb, ped/bikes	1.00	1.00			1.00	1.00		1.00			0.99	
Flpb, ped/bikes	1.00	1.00			0.98	1.00		1.00			1.00	
Frt	1.00	1.00			1.00	0.85		1.00			0.96	
Flt Protected	0.95	0.96			0.98	1.00		1.00			1.00	
Satd. Flow (prot)	1633	1642			3437	1599		3572			3316	
Flt Permitted	0.68	0.67			0.83	1.00		1.00			1.00	
Satd. Flow (perm)	1171	1156			2916	1599		3572			3316	
Volume (vph)	206	7	0	38	66	67	0	1841	8	0	912	342
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	222	8	0	41	71	72	0	1980	9	0	981	368
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	111	119	0	0	112	72	0	1989	0	0	1349	0
Confl. Peds. (#/hr)				35								16
Heavy Vehicles (%)	5%	5%	5%	1%	1%	1%	1%	1%	1%	3%	3%	3%
Turn Type	Perm			Perm		Perm						
Protected Phases		2			2			1			1	
Permitted Phases	2			2		2						
Actuated Green, G (s)	42.0	42.0			42.0	42.0		68.0			68.0	
Effective Green, g (s)	43.0	43.0			43.0	43.0		69.0			69.0	
Actuated g/C Ratio	0.36	0.36			0.36	0.36		0.57			0.57	
Clearance Time (s)	5.0	5.0			5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)	420	414			1045	573		2054			1907	
v/s Ratio Prot								c0.56			0.41	
v/s Ratio Perm	0.09	c0.10			0.04	0.05						
v/c Ratio	0.26	0.29			0.11	0.13		0.97			0.71	
Uniform Delay, d1	27.3	27.5			25.7	25.9		24.5			18.3	
Progression Factor	1.39	1.38			1.00	1.00		1.00			0.31	
Incremental Delay, d2	1.5	1.7			0.2	0.5		11.1			1.9	
Delay (s)	39.5	39.8			25.9	26.3		35.6			7.7	
Level of Service	D	D			C	C		D			A	
Approach Delay (s)		39.7			26.1			35.6			7.7	
Approach LOS		D			C			D			A	

Intersection Summary			
HCM Average Control Delay	25.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		0%	0%		-10%	
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		0.97	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1787	3574	3505		3640	1679
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1787	3574	3505		3640	1679
Volume (vph)	247	1866	977	0	561	233
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	247	1866	977	0	561	233
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	247	1866	977	0	561	233
Heavy Vehicles (%)	1%	1%	3%	3%	1%	1%
Turn Type	Prot					Perm
Protected Phases	2	6	1		3	
Permitted Phases						3
Actuated Green, G (s)	21.0	81.0	55.0		29.0	29.0
Effective Green, g (s)	22.0	82.0	56.0		30.0	30.0
Actuated g/C Ratio	0.18	0.68	0.47		0.25	0.25
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	328	2442	1636		910	420
v/s Ratio Prot	0.14	c0.52	0.28		c0.15	
v/s Ratio Perm						0.14
v/c Ratio	0.75	0.76	0.60		0.62	0.55
Uniform Delay, d1	46.4	12.6	23.7		39.9	39.2
Progression Factor	0.70	0.13	1.00		1.00	1.00
Incremental Delay, d2	7.3	1.1	1.6		3.1	5.2
Delay (s)	39.8	2.7	25.3		43.0	44.4
Level of Service	D	A	C		D	D
Approach Delay (s)		7.0	25.3		43.4	
Approach LOS		A	C		D	

Intersection Summary			
HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			0%			-5%				0%		
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0		
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.91			0.91	0.91		
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00			1.00	0.99		
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00		
Frt	1.00	1.00	1.00	0.85	1.00	0.98			1.00	0.96		
Flt Protected	0.95	0.95	1.00	1.00	0.95	1.00			0.95	0.98		
Satd. Flow (prot)	1787	1787	3574	1599	1807	5125			1626	3194		
Flt Permitted	0.18	0.95	1.00	1.00	0.13	1.00			0.95	0.98		
Satd. Flow (perm)	336	1787	3574	1599	248	5125			1626	3194		
Volume (vph)	68	452	1434	329	27	998	93	32	395	139	52	61
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	70	466	1478	339	28	1029	96	33	407	143	54	63
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	70	466	1478	339	28	1158	0	0	228	439	0	0
Confl. Peds. (#/hr)					22							15
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%	2%	2%	1%	1%	1%	1%
Turn Type	custom	Prot		Perm	Perm				Split			
Protected Phases		1	6			2			4	4		
Permitted Phases	1			6	2							
Actuated Green, G (s)	21.4	21.4	56.1	56.1	29.7	29.7			22.3	22.3		
Effective Green, g (s)	22.4	22.4	57.1	57.1	30.7	30.7			23.3	23.3		
Actuated g/C Ratio	0.18	0.18	0.45	0.45	0.24	0.24			0.18	0.18		
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	59	315	1608	719	60	1240			299	586		
v/s Ratio Prot		c0.26	c0.41			0.23			c0.14	0.14		
v/s Ratio Perm	0.21			0.21	0.11							
v/c Ratio	1.19	1.48	0.92	0.47	0.47	0.93			0.76	0.75		
Uniform Delay, d1	52.2	52.2	32.7	24.4	41.1	47.1			49.2	49.0		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00		
Incremental Delay, d2	176.3	232.1	10.0	2.2	23.9	14.0			10.9	5.2		
Delay (s)	228.5	284.4	42.7	26.6	65.0	61.1			60.1	54.3		
Level of Service	F	F	D	C	E	E			E	D		
Approach Delay (s)			93.8			61.2				56.3		
Approach LOS			F			E				E		

Intersection Summary			
HCM Average Control Delay	75.0	HCM Level of Service	E
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	126.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	107.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBL2	SBL	SBT	SBR	SWL2	SWL	SWR	SWR2
Lane Configurations								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			0%			0%		
Total Lost time (s)		4.0	4.0			4.0	4.0	
Lane Util. Factor		0.95	0.95			1.00	0.88	
Frpb, ped/bikes		1.00	0.99			1.00	0.94	
Flpb, ped/bikes		1.00	1.00			1.00	1.00	
Frt		1.00	0.97			1.00	0.85	
Flt Protected		0.95	0.99			0.95	1.00	
Satd. Flow (prot)		1698	1697			1787	2636	
Flt Permitted		0.95	0.99			0.95	1.00	
Satd. Flow (perm)		1698	1697			1787	2636	
Volume (vph)	44	241	129	49	33	42	245	23
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	45	248	133	51	34	43	253	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	239	238	0	0	77	277	0
Confl. Peds. (#/hr)				18				76
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Split	Split			Split		pm+ov	
Protected Phases	3	3	3		8	8	1	
Permitted Phases							8	
Actuated Green, G (s)		21.7	21.7			6.8	28.2	
Effective Green, g (s)		22.7	22.7			7.8	30.2	
Actuated g/C Ratio		0.18	0.18			0.06	0.24	
Clearance Time (s)		5.0	5.0			5.0	5.0	
Vehicle Extension (s)		3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)		304	304			110	710	
v/s Ratio Prot		c0.14	0.14			c0.04	0.07	
v/s Ratio Perm							0.04	
v/c Ratio		0.79	0.78			0.70	0.39	
Uniform Delay, d1		49.8	49.7			58.4	40.6	
Progression Factor		1.00	1.00			1.00	1.00	
Incremental Delay, d2		12.6	12.4			18.2	0.4	
Delay (s)		62.3	62.1			76.6	41.0	
Level of Service		E	E			E	D	
Approach Delay (s)			62.2			48.7		
Approach LOS			E			D		

Intersection Summary

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#8 NE 50th St & 30th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/1/2004*	Analysis Year	*2015 Baseline PM Peak*
Analysis Time Period	*5:00 pm*		
Project Description	*QFC U-Village Access Study #2400*		
East/West Street:	*NE 50th St*	North/South Street:	*30th Ave NE*
Intersection Orientation:	*North-South*	Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*0*	*475*	*110*	*30*	*347*	*0*
Peak-Hour Factor, PHF	*1.00*	*0.92*	*0.92*	*0.92*	*0.92*	*1.00*
Hourly Flow Rate, HFR	*0*	*516*	*119*	*32*	*377*	*0*
Percent Heavy Vehicles	*0*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*32*	*0*	*35*	*0*	*0*	*0*
Peak-Hour Factor, PHF	*0.92*	*1.00*	*0.92*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*34*	*0*	*38*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*-10*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (vph)		*32*		*72*				
C (m) (vph)		*949*		*347*				
v/c		*0.03*		*0.21*				
95% queue length		*0.10*		*0.77*				
Control Delay		*8.9*		*18.1*				
LOS		*A*		*C*				
Approach Delay	--	--	*18.1*					
Approach LOS	--	--	*C*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#9 NE Blakeley & 30th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/1/2004*	Analysis Year	*2015 Baseline PM Peak*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study #2400*
East/West Street: *NE Blakeley St*	North/South Street: *30th Ave NE*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*9*	*301*		*0*	*303*	*209*
Peak-hour factor, PHF	*0.92*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate (veh/h)	*9*	*327*	*0*	*0*	*329*	*227*
Proportion of heavy vehicles, P_{HV}	*1*	--	--	*0*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*77*	*0*	*16*
Peak-hour factor, PHF	*1.00*	*1.00*	*1.00*	*0.92*	*1.00*	*0.92*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*83*	*0*	*17*
Proportion of heavy vehicles, P_{HV}	*0*	*1*	*0*	*0*	*1*	*1*
Percent grade (%)		*0*			*-10*	
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
Volume, v (vph)	*9*						*100*	
Capacity, c_m (vph)	*1020*						*389*	
v/c ratio	*0.01*						*0.26*	
Queue length (95%)	*0.03*						*1.01*	
Control Delay (s/veh)	*8.6*						*17.4*	
LOS	*A*						*C*	
Approach delay (s/veh)	--	--				*17.4*		
Approach LOS	--	--				*C*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#10 SW Dwy & 25th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/15/2004*	Analysis Year	*2015 PM Baseline*
Analysis Time Period	*5:00 pm*		
Project Description	*QFC U-Village Access Study - #2400*		
East/West Street:	*SW U-Village Dwy*	North/South Street:	*25th Ave NE*
Intersection Orientation:	*North-South*	Study Period (hrs):	*0.25*

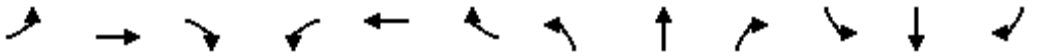
Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*0*	*1090*	*211*	*0*	*575*	*0*
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR	*0*	*1147*	*222*	*0*	*605*	*0*
Percent Heavy Vehicles	*0*	--	--	*1*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*		*T*	
Upstream Signal		*1*			*1*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*68*	*0*	*61*	*0*	*0*	*0*
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*71*	*0*	*64*	*0*	*0*	*0*
Percent Heavy Vehicles	*3*	*0*	*3*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration			*L*		*R*			
v (vph)			*71*		*64*			
C (m) (vph)			*272*		*772*			
v/c			*0.26*		*0.08*			
95% queue length			*1.02*		*0.27*			
Control Delay			*22.8*		*10.1*			
LOS			*C*		*B*			
Approach Delay	--	--	*16.8*					
Approach LOS	--	--	*C*					



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				1.00		1.00	1.00	0.95		1.00	1.00	
Frpb, ped/bikes				1.00		0.88	1.00	0.99		1.00	1.00	
Flpb, ped/bikes				1.00		1.00	0.97	1.00		0.99	1.00	
Frt				1.00		0.85	1.00	0.98		1.00	0.99	
Flt Protected				0.95		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1787		1413	1713	3442		1755	1847	
Flt Permitted				0.95		1.00	0.45	1.00		0.19	1.00	
Satd. Flow (perm)				1787		1413	805	3442		359	1847	
Volume (vph)	0	0	0	126	0	224	7	980	137	171	423	15
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	131	0	233	7	1021	143	178	441	16
RTOR Reduction (vph)	0	0	0	0	0	92	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	131	0	142	7	1164	0	178	457	0
Confl. Peds. (#/hr)						80	35		28	28		35
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type				Prot		custom	Perm			Perm		
Protected Phases				2				1			1	
Permitted Phases						2	1			1		
Actuated Green, G (s)				19.0		19.0	51.0	51.0		51.0	51.0	
Effective Green, g (s)				20.0		20.0	52.0	52.0		52.0	52.0	
Actuated g/C Ratio				0.25		0.25	0.65	0.65		0.65	0.65	
Clearance Time (s)				5.0		5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)				447		353	523	2237		233	1201	
v/s Ratio Prot				0.07				0.34			0.25	
v/s Ratio Perm						c0.10	0.01			c0.50		
v/c Ratio				0.29		0.40	0.01	0.52		0.76	0.38	
Uniform Delay, d1				24.3		25.0	4.9	7.4		9.7	6.5	
Progression Factor				1.00		1.00	1.00	1.00		0.90	0.40	
Incremental Delay, d2				1.7		3.4	0.0	0.9		20.4	0.9	
Delay (s)				25.9		28.4	5.0	8.3		29.1	3.5	
Level of Service				C		C	A	A		C	A	
Approach Delay (s)		0.0			27.5			8.3			10.7	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM Average Control Delay	12.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#12 NW U-Vil Dwy & 25th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*06/03/2004*	Analysis Year	*2015 PM Baseline*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study - #2400*
East/West Street: *NW U-Village Dwy*	North/South Street: *25th Ave NE*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*1*	*1213*	*11*	*80*	*581*	*7*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR	*1*	*1276*	*11*	*84*	*611*	*7*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*1*	*0*
Configuration	*L*	*T*	*TR*	*L*		*TR*
Upstream Signal		*1*			*1*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*29*	*0*	*113*	*37*	*0*	*17*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR	*30*	*0*	*118*	*38*	*0*	*17*
Percent Heavy Vehicles	*1*	*1*	*1*	*2*	*2*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*1*	*0*
Configuration	*L*		*R*		*LTR*	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*	*L*		*R*		*LTR*	
v (vph)	*1*	*84*	*30*		*118*		*55*	
C (m) (vph)	*813*	*504*	*95*		*578*		*222*	
v/c	*0.00*	*0.17*	*0.32*		*0.20*		*0.25*	
95% queue length	*0.00*	*0.59*	*1.21*		*0.76*		*0.95*	
Control Delay	*9.4*	*13.6*	*59.5*		*12.8*		*26.5*	
LOS	*A*	*B*	*F*		*B*		*D*	
Approach Delay	--	--	*22.3*			*26.5*		
Approach LOS	--	--	*C*			*D*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#13 NE 45th St & S (RIRO) Dwy*
Agency/Co.		Jurisdiction	
Date Performed	*11/01/2004*	Analysis Year	*2015 Baseline PM peak*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study #2400*
East/West Street: *NE 45th St*	North/South Street: *South RIRO U-Village Dwy*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*0*	*632*	*62*
Peak-hour factor, PHF	*0.98*	*0.98*	*1.00*	*1.00*	*0.98*	*0.98*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*0*	*644*	*63*
Proportion of heavy vehicles, P_{HV}	*2*	--	--	*0*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration						*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*0*	*0*	*147*
Peak-hour factor, PHF	*1.00*	*1.00*	*1.00*	*0.98*	*1.00*	*0.98*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*0*	*0*	*149*
Proportion of heavy vehicles, P_{HV}	*0*	*0*	*0*	*1*	*0*	*1*
Percent grade (%)		*0*			*0*	
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
Volume, v (vph)								*149*
Capacity, c_m (vph)								*453*
v/c ratio								*0.33*
Queue length (95%)								*1.42*
Control Delay (s/veh)								*16.8*
LOS								*C*
Approach delay (s/veh)	--	--				*16.8*		
Approach LOS	--	--				*C*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#14 NE 45th St & SE QFC Dwy*
Agency/Co.		Jurisdiction	
Date Performed	*12/7/2004*	Analysis Year	*2015 Baseline PM*
Analysis Time Period	*5:00 pm*		

Project Description *QFC U-Village Access Study - #2400*

East/West Street: *NE 45th Street* | North/South Street: *SE QFC Dwy*

Intersection Orientation: *East-West* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*248*	*2136*	*0*	*0*	*1552*	*117*
Peak-hour factor, PHF	*0.99*	*0.99*	*1.00*	*1.00*	*0.99*	*0.99*
Hourly Flow Rate (veh/h)	*250*	*2157*	*0*	*0*	*1567*	*118*
Proportion of heavy vehicles, P_{HV}	*2*	--	--	*0*	--	--
Median type	*Raised curb*					
RT Channelized?			*0*			*0*
Lanes	*1*	*2*	*0*	*0*	*2*	*0*
Configuration	*L*	*T*			*T*	*TR*
Upstream Signal		*1*			*1*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*38*	*0*	*119*
Peak-hour factor, PHF	*1.00*	*1.00*	*1.00*	*0.99*	*1.00*	*0.99*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*38*	*0*	*120*
Proportion of heavy vehicles, P_{HV}	*0*	*0*	*0*	*1*	*0*	*1*
Percent grade (%)		*0*			*0*	
Flared approach		*N*			*Y*	
Storage		*0*			*3*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*					*L*		*R*
Volume, v (vph)	*250*					*38*		*120*
Capacity, c_m (vph)	*411*					*117*		*761*
v/c ratio	*0.61*					*0.32*		*0.16*
Queue length (95%)	*3.90*					*1.28*		*0.56*
Control Delay (s/veh)	*26.4*					*49.9*		*10.6*
LOS	*D*					*E*		*B*
Approach delay (s/veh)	--	--				*20.1*		
Approach LOS	--	--				*C*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#15 NE QFC Dwy & 30th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/01/2004*	Analysis Year	*2015 Baseline PM Peak*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study #2400*
East/West Street: *NE QFC Dwy*	North/South Street: *30th Ave NE*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

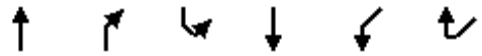
Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*57*	*372*	*0*	*0*	*264*	*98*
Peak-Hour Factor, PHF	*0.93*	*0.93*	*1.00*	*1.00*	*0.93*	*0.93*
Hourly Flow Rate, HFR	*61*	*399*	*0*	*0*	*283*	*105*
Percent Heavy Vehicles	*1*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*1*	*0*	*0*	*1*	*0*
Configuration	*L*	*T*				*TR*
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*0*	*0*	*0*	*190*	*0*	*154*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.93*	*1.00*	*0.93*
Hourly Flow Rate, HFR	*0*	*0*	*0*	*204*	*0*	*165*
Percent Heavy Vehicles	*0*	*0*	*0*	*1*	*0*	*1*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*					*L*		*R*
v (vph)	*61*					*204*		*165*
C (m) (vph)	*1170*					*310*		*704*
v/c	*0.05*					*0.66*		*0.23*
95% queue length	*0.16*					*4.35*		*0.91*
Control Delay	*8.2*					*36.4*		*11.7*
LOS	*A*					*E*		*B*
Approach Delay	--	--				*25.4*		
Approach LOS	--	--				*D*		

2015 with Access Scenario B
PM Peak Hour



Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.88		0.95	0.97	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	1.00	1.00		1.00	0.95	
Satd. Flow (prot)	3574	2814		3471	3433	
Flt Permitted	1.00	1.00		1.00	0.95	
Satd. Flow (perm)	3574	2814		3471	3433	
Volume (vph)	1187	1662	0	515	942	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1236	1731	0	536	981	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1236	1731	0	536	981	0
Heavy Vehicles (%)	1%	1%	4%	4%	2%	2%
Turn Type	Prot					
Protected Phases	2	1 2		2	1	
Permitted Phases						
Actuated Green, G (s)	43.0	120.0		43.0	67.0	
Effective Green, g (s)	44.0	120.0		44.0	68.0	
Actuated g/C Ratio	0.37	1.00		0.37	0.57	
Clearance Time (s)	5.0			5.0	5.0	
Lane Grp Cap (vph)	1310	2814		1273	1945	
v/s Ratio Prot	c0.35	c0.62		0.15	0.29	
v/s Ratio Perm						
v/c Ratio	0.94	0.62		0.42	0.50	
Uniform Delay, d1	36.8	0.0		28.5	15.8	
Progression Factor	1.00	1.00		1.38	1.92	
Incremental Delay, d2	14.6	1.0		0.9	0.6	
Delay (s)	51.4	1.0		40.3	30.9	
Level of Service	D	A		D	C	
Approach Delay (s)	22.0			40.3	30.9	
Approach LOS	C			D	C	

Intersection Summary			
HCM Average Control Delay	26.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	66.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98			0.92		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94			0.88		1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1656	3073			2880		1787	3571		1787	3388	
Flt Permitted	0.31	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	544	3073			2880		1787	3571		1787	3388	
Volume (vph)	172	132	79	0	98	322	112	1070	6	75	440	147
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	183	140	84	0	104	343	119	1138	6	80	468	156
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	183	224	0	0	447	0	119	1144	0	80	624	0
Confl. Peds. (#/hr)			16			50			15			25
Heavy Vehicles (%)	9%	9%	9%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt						Prot			Prot		
Protected Phases	3	8			4		5	2		1	6	
Permitted Phases	8											
Actuated Green, G (s)	41.5	41.5			31.0		19.0	45.0		19.0	45.0	
Effective Green, g (s)	42.0	42.0			32.0		20.0	46.0		20.0	46.0	
Actuated g/C Ratio	0.35	0.35			0.27		0.17	0.38		0.17	0.38	
Clearance Time (s)	3.0	4.5			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	246	1076			768		298	1369		298	1299	
v/s Ratio Prot	c0.04	0.07			0.16		0.07	c0.32		0.04	c0.18	
v/s Ratio Perm	c0.22											
v/c Ratio	0.74	0.21			0.89dr		0.40	0.84		0.27	0.48	
Uniform Delay, d1	34.1	27.3			38.2		44.6	33.6		43.6	28.0	
Progression Factor	1.00	1.00			0.67		1.05	1.09		1.00	1.00	
Incremental Delay, d2	18.3	0.4			2.4		1.5	2.4		2.2	1.3	
Delay (s)	52.5	27.8			28.0		48.5	38.9		45.8	29.2	
Level of Service	D	C			C		D	D		D	C	
Approach Delay (s)		38.9			28.0			39.8			31.1	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM Average Control Delay	35.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		

dr Defacto Right Lane. Recode with 1 though lane as a right lane.

c Critical Lane Group

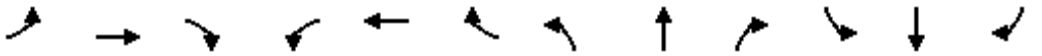
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.65		0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.94		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.94		1.00	0.98		1.00	1.00	
Flt Protected		0.99	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1862	1033		1618		1778	3484		1770	3522	
Flt Permitted		0.94	1.00		0.91		0.51	1.00		0.16	1.00	
Satd. Flow (perm)		1762	1033		1496		956	3484		289	3522	
Volume (vph)	18	102	203	51	86	99	280	1011	115	55	366	11
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	19	106	211	53	90	103	292	1053	120	57	381	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	125	211	0	246	0	292	1173	0	57	392	0
Confl. Peds. (#/hr)	23		455	455		23	3		28	28		3
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2		2	2			1			1		
Actuated Green, G (s)		27.0	27.0		27.0		42.0	42.0		42.0	42.0	
Effective Green, g (s)		29.0	29.0		29.0		43.0	43.0		43.0	43.0	
Actuated g/C Ratio		0.36	0.36		0.36		0.54	0.54		0.54	0.54	
Clearance Time (s)		6.0	6.0		6.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		639	374		542		514	1873		155	1893	
v/s Ratio Prot								c0.34			0.11	
v/s Ratio Perm		0.07	c0.20		0.16		0.31			0.20		
v/c Ratio		0.20	0.56		0.45		0.57	0.63		0.37	0.21	
Uniform Delay, d1		17.5	20.4		19.5		12.3	12.9		10.7	9.6	
Progression Factor		1.00	1.00		1.00		0.68	0.66		1.09	0.81	
Incremental Delay, d2		0.7	6.0		2.7		4.0	1.4		6.2	0.2	
Delay (s)		18.2	26.5		22.2		12.4	10.0		17.8	8.1	
Level of Service		B	C		C		B	A		B	A	
Approach Delay (s)		23.4			22.2			10.4			9.3	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			5%			-5%	
Total Lost time (s)		4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor		1.00			1.00	1.00		0.95			0.95	
Frpb, ped/bikes		0.99			1.00	0.90		0.98			0.99	
Flpb, ped/bikes		1.00			0.99	1.00		1.00			1.00	
Frt		0.99			1.00	0.85		0.97			0.98	
Flt Protected		0.99			0.98	1.00		1.00			1.00	
Satd. Flow (prot)		1827			1839	1447		3241			3517	
Flt Permitted		0.93			0.74	1.00		0.85			0.79	
Satd. Flow (perm)		1703			1381	1447		2775			2790	
Volume (vph)	46	322	37	108	240	28	108	805	234	27	319	41
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	48	339	39	114	253	29	114	847	246	28	336	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	426	0	0	367	29	0	1207	0	0	407	0
Confl. Peds. (#/hr)	53		40	40		53	36		36	36		36
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2		2	1			1		
Actuated Green, G (s)		35.0			35.0	35.0		35.0			35.0	
Effective Green, g (s)		36.0			36.0	36.0		36.0			36.0	
Actuated g/C Ratio		0.45			0.45	0.45		0.45			0.45	
Clearance Time (s)		5.0			5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)		766			621	651		1249			1256	
v/s Ratio Prot												
v/s Ratio Perm		0.25			c0.27	0.02		c0.44			0.15	
v/c Ratio		0.56			0.59	0.04		0.97			0.32	
Uniform Delay, d1		16.1			16.5	12.3		21.4			14.2	
Progression Factor		1.00			1.00	1.00		0.52			1.00	
Incremental Delay, d2		2.9			4.1	0.1		16.2			0.7	
Delay (s)		19.0			20.6	12.5		27.3			14.9	
Level of Service		B			C	B		C			B	
Approach Delay (s)		19.0			20.0			27.3			14.9	
Approach LOS		B			B			C			B	

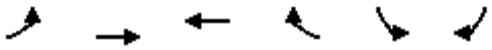
Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	100.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor	0.95	0.95			0.95	1.00		0.95			0.95	
Frpb, ped/bikes	1.00	1.00			1.00	1.00		1.00			0.98	
Flpb, ped/bikes	1.00	1.00			0.98	1.00		1.00			1.00	
Frt	1.00	1.00			1.00	0.85		1.00			0.95	
Flt Protected	0.95	0.96			0.98	1.00		1.00			1.00	
Satd. Flow (prot)	1633	1642			3437	1599		3572			3294	
Flt Permitted	0.68	0.67			0.83	1.00		1.00			1.00	
Satd. Flow (perm)	1171	1156			2916	1599		3572			3294	
Volume (vph)	206	7	0	38	66	67	0	1650	8	0	912	399
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	222	8	0	41	71	72	0	1774	9	0	981	429
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	111	119	0	0	112	72	0	1783	0	0	1410	0
Confl. Peds. (#/hr)				35								16
Heavy Vehicles (%)	5%	5%	5%	1%	1%	1%	1%	1%	1%	3%	3%	3%
Turn Type	Perm			Perm		Perm						
Protected Phases		2			2			1			1	
Permitted Phases	2			2		2						
Actuated Green, G (s)	42.0	42.0			42.0	42.0		68.0			68.0	
Effective Green, g (s)	43.0	43.0			43.0	43.0		69.0			69.0	
Actuated g/C Ratio	0.36	0.36			0.36	0.36		0.57			0.57	
Clearance Time (s)	5.0	5.0			5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)	420	414			1045	573		2054			1894	
v/s Ratio Prot								c0.50			0.43	
v/s Ratio Perm	0.09	c0.10			0.04	0.05						
v/c Ratio	0.26	0.29			0.11	0.13		0.87			0.74	
Uniform Delay, d1	27.3	27.5			25.7	25.9		21.6			18.9	
Progression Factor	1.40	1.39			1.00	1.00		1.00			0.32	
Incremental Delay, d2	1.5	1.7			0.2	0.5		4.3			2.3	
Delay (s)	39.8	40.1			25.9	26.3		26.0			8.4	
Level of Service	D	D			C	C		C			A	
Approach Delay (s)		40.0			26.1			26.0			8.4	
Approach LOS		D			C			C			A	

Intersection Summary			
HCM Average Control Delay	20.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		0%	0%		-10%	
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		0.97	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1787	3574	3505		3640	1679
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1787	3574	3505		3640	1679
Volume (vph)	247	1675	977	0	504	290
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	247	1675	977	0	504	290
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	247	1675	977	0	504	290
Heavy Vehicles (%)	1%	1%	3%	3%	1%	1%
Turn Type	Prot					Perm
Protected Phases	2	6	1		3	
Permitted Phases						3
Actuated Green, G (s)	21.0	81.0	55.0		29.0	29.0
Effective Green, g (s)	22.0	82.0	56.0		30.0	30.0
Actuated g/C Ratio	0.18	0.68	0.47		0.25	0.25
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	328	2442	1636		910	420
v/s Ratio Prot	0.14	c0.47	0.28		0.14	
v/s Ratio Perm						c0.17
v/c Ratio	0.75	0.69	0.60		0.55	0.69
Uniform Delay, d1	46.4	11.3	23.7		39.2	40.8
Progression Factor	0.73	0.15	1.00		1.00	1.00
Incremental Delay, d2	9.4	1.0	1.6		2.4	9.0
Delay (s)	43.4	2.7	25.3		41.6	49.8
Level of Service	D	A	C		D	D
Approach Delay (s)		7.9	25.3		44.6	
Approach LOS		A	C		D	

Intersection Summary			
HCM Average Control Delay	20.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			0%			-5%				0%		
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0		
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.91			0.91	0.91		
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00			1.00	0.99		
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00		
Frt	1.00	1.00	1.00	0.85	1.00	0.98			1.00	0.96		
Flt Protected	0.95	0.95	1.00	1.00	0.95	1.00			0.95	0.98		
Satd. Flow (prot)	1787	1787	3574	1599	1806	5125			1626	3193		
Flt Permitted	0.18	0.95	1.00	1.00	0.13	1.00			0.95	0.98		
Satd. Flow (perm)	336	1787	3574	1599	248	5125			1626	3193		
Volume (vph)	68	444	1384	311	27	998	93	32	395	139	52	61
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	70	458	1427	321	28	1029	96	33	407	143	54	63
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	70	458	1427	321	28	1158	0	0	228	439	0	0
Confl. Peds. (#/hr)					22							15
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%	2%	2%	1%	1%	1%	1%
Turn Type	custom	Prot		Perm	Perm				Split			
Protected Phases		1	6			2			4	4		
Permitted Phases	1			6	2							
Actuated Green, G (s)	21.4	21.4	56.0	56.0	29.6	29.6			22.7	22.7		
Effective Green, g (s)	22.4	22.4	57.0	57.0	30.6	30.6			23.7	23.7		
Actuated g/C Ratio	0.17	0.17	0.44	0.44	0.24	0.24			0.18	0.18		
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	58	310	1576	705	59	1213			298	585		
v/s Ratio Prot		c0.26	c0.40			0.23			c0.14	0.14		
v/s Ratio Perm	0.21			0.20	0.11							
v/c Ratio	1.21	1.48	0.91	0.46	0.47	0.95			0.77	0.75		
Uniform Delay, d1	53.5	53.5	33.6	25.3	42.4	48.7			50.2	50.0		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00		
Incremental Delay, d2	184.5	231.5	9.0	2.1	24.9	17.0			11.1	5.4		
Delay (s)	237.9	285.0	42.7	27.4	67.4	65.7			61.3	55.4		
Level of Service	F	F	D	C	E	E			E	E		
Approach Delay (s)			95.3			65.7				57.4		
Approach LOS			F			E				E		

Intersection Summary			
HCM Average Control Delay	77.1	HCM Level of Service	E
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	129.3	Sum of lost time (s)	16.0
Intersection Capacity Utilization	107.9%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBL2	SBL	SBT	SBR	SWL2	SWL	SWR	SWR2
Lane Configurations								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			0%			0%		
Total Lost time (s)		4.0	4.0			4.0	4.0	
Lane Util. Factor		0.95	0.95			1.00	0.88	
Frpb, ped/bikes		1.00	0.99			1.00	0.94	
Flpb, ped/bikes		1.00	1.00			1.00	1.00	
Frt		1.00	0.97			1.00	0.85	
Flt Protected		0.95	0.99			0.95	1.00	
Satd. Flow (prot)		1698	1703			1787	2633	
Flt Permitted		0.95	0.99			0.95	1.00	
Satd. Flow (perm)		1698	1703			1787	2633	
Volume (vph)	44	291	147	49	33	42	245	23
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	45	300	152	51	34	43	253	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	274	274	0	0	77	277	0
Confl. Peds. (#/hr)				18				76
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Split	Split			Split		pm+ov	
Protected Phases	3	3	3		8	8	1	
Permitted Phases							8	
Actuated Green, G (s)		23.8	23.8			6.8	28.2	
Effective Green, g (s)		24.8	24.8			7.8	30.2	
Actuated g/C Ratio		0.19	0.19			0.06	0.23	
Clearance Time (s)		5.0	5.0			5.0	5.0	
Vehicle Extension (s)		3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)		326	327			108	696	
v/s Ratio Prot		c0.16	0.16			c0.04	0.07	
v/s Ratio Perm							0.04	
v/c Ratio		0.84	0.84			0.71	0.40	
Uniform Delay, d1		50.3	50.3			59.7	41.9	
Progression Factor		1.00	1.00			1.00	1.00	
Incremental Delay, d2		17.4	16.8			19.9	0.4	
Delay (s)		67.8	67.1			79.5	42.2	
Level of Service		E	E			E	D	
Approach Delay (s)			67.5			50.4		
Approach LOS			E			D		

Intersection Summary

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#8 NE 50th St & 30th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/8/2004*	Analysis Year	*2015 PM w/ RIRO QFC Dwy*
Analysis Time Period	*5:00 pm*		
Project Description	*QFC U-Village Access Study #2400*		
East/West Street:	*NE 50th St*	North/South Street:	*30th Ave NE*
Intersection Orientation:	*North-South*	Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*0*	*480*	*113*	*30*	*347*	*0*
Peak-Hour Factor, PHF	*1.00*	*0.92*	*0.92*	*0.92*	*0.92*	*1.00*
Hourly Flow Rate, HFR	*0*	*521*	*122*	*32*	*377*	*0*
Percent Heavy Vehicles	*0*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*32*	*0*	*35*	*0*	*0*	*0*
Peak-Hour Factor, PHF	*0.92*	*1.00*	*0.92*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*34*	*0*	*38*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*-10*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (vph)		*32*		*72*				
C (m) (vph)		*942*		*344*				
v/c		*0.03*		*0.21*				
95% queue length		*0.11*		*0.78*				
Control Delay		*9.0*		*18.2*				
LOS		*A*		*C*				
Approach Delay	--	--	*18.2*					
Approach LOS	--	--	*C*					

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#9 NE Blakeley & 30th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/8/2004*	Analysis Year	*2015 PM w/RIRO QFC Dwy*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study #2400*
East/West Street: *NE Blakeley St*	North/South Street: *30th Ave NE*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*9*	*301*		*0*	*303*	*214*
Peak-hour factor, PHF	*0.92*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate (veh/h)	*9*	*327*	*0*	*0*	*329*	*232*
Proportion of heavy vehicles, P_{HV}	*1*	--	--	*0*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*77*	*0*	*16*
Peak-hour factor, PHF	*1.00*	*1.00*	*1.00*	*0.92*	*1.00*	*0.92*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*83*	*0*	*17*
Proportion of heavy vehicles, P_{HV}	*0*	*1*	*0*	*0*	*1*	*1*
Percent grade (%)		*0*			*-10*	
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
Volume, v (vph)	*9*						*100*	
Capacity, c_m (vph)	*1015*						*387*	
v/c ratio	*0.01*						*0.26*	
Queue length (95%)	*0.03*						*1.02*	
Control Delay (s/veh)	*8.6*						*17.5*	
LOS	*A*						*C*	
Approach delay (s/veh)	--	--				*17.5*		
Approach LOS	--	--				*C*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#10 SW Dwy & 25th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/15/2004*	Analysis Year	*2015 PM w/ RIRO at QFC dwy*
Analysis Time Period	*5:00 pm*		

Project Description *QFC U-Village Access Study - #2400*

East/West Street: *SW U-Village Dwy* | North/South Street: *25th Ave NE*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*0*	*1188*	*361*	*0*	*575*	*0*
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR	*0*	*1250*	*380*	*0*	*605*	*0*
Percent Heavy Vehicles	*0*	--	--	*1*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*		*T*	
Upstream Signal		*1*			*1*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*68*	*0*	*61*	*0*	*0*	*0*
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*71*	*0*	*64*	*0*	*0*	*0*
Percent Heavy Vehicles	*3*	*0*	*3*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration			*L*		*R*			
v (vph)			*71*		*64*			
C (m) (vph)			*245*		*689*			
v/c			*0.29*		*0.09*			
95% queue length			*1.16*		*0.31*			
Control Delay			*25.6*		*10.8*			
LOS			*D*		*B*			
Approach Delay	--	--	*18.6*					
Approach LOS	--	--	*C*					

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				1.00		1.00	1.00	0.95		1.00	1.00	
Frpb, ped/bikes				1.00		0.88	1.00	0.99		1.00	1.00	
Flpb, ped/bikes				1.00		1.00	0.97	1.00		0.99	1.00	
Frt				1.00		0.85	1.00	0.97		1.00	0.99	
Flt Protected				0.95		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1787		1413	1713	3387		1758	1847	
Flt Permitted				0.95		1.00	0.45	1.00		0.17	1.00	
Satd. Flow (perm)				1787		1413	805	3387		309	1847	
Volume (vph)	0	0	0	126	0	224	7	980	235	171	423	15
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	131	0	233	7	1021	245	178	441	16
RTOR Reduction (vph)	0	0	0	0	0	92	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	131	0	142	7	1266	0	178	457	0
Confl. Peds. (#/hr)						80	35		28	28		35
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type				Prot		custom	Perm			Perm		
Protected Phases				2				1			1	
Permitted Phases						2	1			1		
Actuated Green, G (s)				19.0		19.0	51.0	51.0		51.0	51.0	
Effective Green, g (s)				20.0		20.0	52.0	52.0		52.0	52.0	
Actuated g/C Ratio				0.25		0.25	0.65	0.65		0.65	0.65	
Clearance Time (s)				5.0		5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)				447		353	523	2202		201	1201	
v/s Ratio Prot				0.07				0.37			0.25	
v/s Ratio Perm						c0.10	0.01			c0.58		
v/c Ratio				0.29		0.40	0.01	0.57		0.89	0.38	
Uniform Delay, d1				24.3		25.0	4.9	7.8		11.5	6.5	
Progression Factor				1.00		1.00	1.00	1.00		0.94	0.39	
Incremental Delay, d2				1.7		3.4	0.0	1.1		38.5	0.9	
Delay (s)				25.9		28.4	5.0	8.9		49.4	3.4	
Level of Service				C		C	A	A		D	A	
Approach Delay (s)		0.0			27.5			8.9			16.3	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM Average Control Delay	14.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#12 NW U-Vil Dwy & 25th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/15/2004*	Analysis Year	*2015 PM w/RIRO at QFC Dwy*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study - #2400*
East/West Street: *NW U-Village Dwy*	North/South Street: *25th Ave NE*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*1*	*1213*	*11*	*80*	*581*	*7*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR	*1*	*1276*	*11*	*84*	*611*	*7*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*1*	*0*
Configuration	*L*	*T*	*TR*	*L*		*TR*
Upstream Signal		*1*			*1*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*29*	*0*	*113*	*37*	*0*	*17*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR	*30*	*0*	*118*	*38*	*0*	*17*
Percent Heavy Vehicles	*1*	*1*	*1*	*2*	*2*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*1*	*0*
Configuration	*L*		*R*		*LTR*	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*	*L*		*R*		*LTR*	
v (vph)	*1*	*84*	*30*		*118*		*55*	
C (m) (vph)	*813*	*504*	*95*		*578*		*222*	
v/c	*0.00*	*0.17*	*0.32*		*0.20*		*0.25*	
95% queue length	*0.00*	*0.59*	*1.21*		*0.76*		*0.95*	
Control Delay	*9.4*	*13.6*	*59.5*		*12.8*		*26.5*	
LOS	*A*	*B*	*F*		*B*		*D*	
Approach Delay	--	--	*22.3*			*26.5*		
Approach LOS	--	--	*C*			*D*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#13 NE 45th & S (RIRO) Dwy*
Agency/Co.		Jurisdiction	
Date Performed	*11/01/2004*	Analysis Year	*2015 PM with RIRO at SE Dwy*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study #2400*
East/West Street: *NE 45th St*	North/South Street: *South RIRO U-Village Dwy*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*0*	*632*	*62*
Peak-hour factor, PHF	*0.98*	*0.98*	*1.00*	*1.00*	*0.98*	*0.98*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*0*	*644*	*63*
Proportion of heavy vehicles, P_{HV}	*2*	--	--	*0*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration						*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*0*	*0*	*147*
Peak-hour factor, PHF	*1.00*	*1.00*	*1.00*	*0.98*	*1.00*	*0.98*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*0*	*0*	*149*
Proportion of heavy vehicles, P_{HV}	*0*	*0*	*0*	*1*	*0*	*1*
Percent grade (%)		*0*			*0*	
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
Volume, v (vph)								*149*
Capacity, c_m (vph)								*453*
v/c ratio								*0.33*
Queue length (95%)								*1.42*
Control Delay (s/veh)								*16.8*
LOS								*C*
Approach delay (s/veh)	--	--				*16.8*		
Approach LOS	--	--				*C*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#14 NE 45th St & SE QFC Dwy*
Agency/Co.		Jurisdiction	
Date Performed	*12/7/2004*	Analysis Year	*2015 PM with RIRO Dwy*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study - #2400*
East/West Street: *NE 45th Street*	North/South Street: *SE QFC Driveway*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*2136*	*0*	*0*	*1552*	*117*
Peak-hour factor, PHF	*0.99*	*0.99*	*1.00*	*1.00*	*0.99*	*0.99*
Hourly Flow Rate (veh/h)	*0*	*2157*	*0*	*0*	*1567*	*118*
Proportion of heavy vehicles, P_{HV}	*2*	--	--	*0*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*			*T*	*TR*
Upstream Signal		*1*			*1*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*0*	*0*	*119*
Peak-hour factor, PHF	*1.00*	*1.00*	*1.00*	*0.99*	*1.00*	*0.99*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*0*	*0*	*120*
Proportion of heavy vehicles, P_{HV}	*0*	*0*	*0*	*1*	*0*	*1*
Percent grade (%)		*0*			*0*	
Flared approach		*N*			*N*	
Storage		*0*			*3*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
Volume, v (vph)								*120*
Capacity, c_m (vph)								*690*
v/c ratio								*0.17*
Queue length (95%)								*0.63*
Control Delay (s/veh)								*11.3*
LOS								*B*
Approach delay (s/veh)	--	--				*11.3*		
Approach LOS	--	--				*B*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#15 NE QFC Dwy & 30th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/08/2004*	Analysis Year	*2015 PM with RIRO at QFC Dwy*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study - #2400*
East/West Street: *NE QFC Dwy*	North/South Street: *30th Ave NE*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*57*	*372*	*0*	*0*	*264*	*98*
Peak-Hour Factor, PHF	*0.93*	*0.93*	*1.00*	*1.00*	*0.93*	*0.93*
Hourly Flow Rate, HFR	*61*	*399*	*0*	*0*	*283*	*105*
Percent Heavy Vehicles	*1*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*1*	*0*	*0*	*1*	*0*
Configuration	*L*	*T*				*TR*
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*0*	*0*	*0*	*198*	*0*	*184*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.93*	*1.00*	*0.93*
Hourly Flow Rate, HFR	*0*	*0*	*0*	*212*	*0*	*197*
Percent Heavy Vehicles	*0*	*0*	*0*	*1*	*0*	*1*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*					*L*		*R*
v (vph)	*61*					*212*		*197*
C (m) (vph)	*1170*					*310*		*704*
v/c	*0.05*					*0.68*		*0.28*
95% queue length	*0.16*					*4.69*		*1.14*
Control Delay	*8.2*					*38.4*		*12.1*
LOS	*A*					*E*		*B*
Approach Delay	--	--				*25.7*		
Approach LOS	--	--				*D*		

2015 with Access Scenario C
PM Peak Hour

Movement	NBT	NBR	SBL	SBT	SWL	SWR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.95	0.88		0.95	0.97	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	1.00	1.00		1.00	0.95	
Satd. Flow (prot)	3574	2814		3471	3433	
Flt Permitted	1.00	1.00		1.00	0.95	
Satd. Flow (perm)	3574	2814		3471	3433	
Volume (vph)	996	1853	0	515	942	0
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	1038	1930	0	536	981	0
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	1038	1930	0	536	981	0
Heavy Vehicles (%)	1%	1%	4%	4%	2%	2%
Turn Type	Prot					
Protected Phases	2	1 2		2	1	
Permitted Phases						
Actuated Green, G (s)	43.0	120.0		43.0	67.0	
Effective Green, g (s)	44.0	120.0		44.0	68.0	
Actuated g/C Ratio	0.37	1.00		0.37	0.57	
Clearance Time (s)	5.0			5.0	5.0	
Lane Grp Cap (vph)	1310	2814		1273	1945	
v/s Ratio Prot	c0.29	c0.69		0.15	0.29	
v/s Ratio Perm						
v/c Ratio	0.79	0.69		0.42	0.50	
Uniform Delay, d1	33.9	0.0		28.5	15.8	
Progression Factor	1.00	1.00		1.38	1.84	
Incremental Delay, d2	5.0	1.4		0.9	0.7	
Delay (s)	38.9	1.4		40.3	29.7	
Level of Service	D	A		D	C	
Approach Delay (s)	14.5			40.3	29.7	
Approach LOS	B			D	C	

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95			0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.98			0.92		1.00	1.00		1.00	0.98	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94			0.89		1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1656	3073			2910		1787	3570		1787	3388	
Flt Permitted	0.36	1.00			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	629	3073			2910		1787	3570		1787	3388	
Volume (vph)	172	132	79	0	98	265	112	879	6	75	440	147
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	183	140	84	0	104	282	119	935	6	80	468	156
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	183	224	0	0	386	0	119	941	0	80	624	0
Confl. Peds. (#/hr)			16			50			15			25
Heavy Vehicles (%)	9%	9%	9%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Turn Type	pm+pt						Prot			Prot		
Protected Phases	3	8			4		5	2		1	6	
Permitted Phases	8											
Actuated Green, G (s)	41.5	41.5			31.0		19.0	45.0		19.0	45.0	
Effective Green, g (s)	42.0	42.0			32.0		20.0	46.0		20.0	46.0	
Actuated g/C Ratio	0.35	0.35			0.27		0.17	0.38		0.17	0.38	
Clearance Time (s)	3.0	4.5			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	272	1076			776		298	1369		298	1299	
v/s Ratio Prot	c0.03	0.07			0.13		0.07	c0.26		0.04	c0.18	
v/s Ratio Perm	c0.20											
v/c Ratio	0.67	0.21			0.50		0.40	0.69		0.27	0.48	
Uniform Delay, d1	33.1	27.3			37.2		44.6	31.0		43.6	28.0	
Progression Factor	1.00	1.00			0.79		1.10	1.14		1.00	1.00	
Incremental Delay, d2	12.5	0.4			1.8		2.4	1.7		2.2	1.3	
Delay (s)	45.6	27.8			31.1		51.4	37.1		45.8	29.2	
Level of Service	D	C			C		D	D		D	C	
Approach Delay (s)		35.8			31.1			38.7			31.1	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM Average Control Delay	35.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0		4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.65		0.98		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.94		1.00	1.00		1.00	1.00	
Frt		1.00	0.85		0.94		1.00	0.98		1.00	1.00	
Flt Protected		0.99	1.00		0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1862	1033		1618		1778	3484		1770	3522	
Flt Permitted		0.94	1.00		0.91		0.51	1.00		0.16	1.00	
Satd. Flow (perm)		1762	1033		1496		956	3484		289	3522	
Volume (vph)	18	102	203	51	86	99	280	1011	115	55	366	11
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	19	106	211	53	90	103	292	1053	120	57	381	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	125	211	0	246	0	292	1173	0	57	392	0
Confl. Peds. (#/hr)	23		455	455		23	3		28	28		3
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2		2	2			1			1		
Actuated Green, G (s)		27.0	27.0		27.0		42.0	42.0		42.0	42.0	
Effective Green, g (s)		29.0	29.0		29.0		43.0	43.0		43.0	43.0	
Actuated g/C Ratio		0.36	0.36		0.36		0.54	0.54		0.54	0.54	
Clearance Time (s)		6.0	6.0		6.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		639	374		542		514	1873		155	1893	
v/s Ratio Prot								c0.34			0.11	
v/s Ratio Perm		0.07	c0.20		0.16		0.31			0.20		
v/c Ratio		0.20	0.56		0.45		0.57	0.63		0.37	0.21	
Uniform Delay, d1		17.5	20.4		19.5		12.3	12.9		10.7	9.6	
Progression Factor		1.00	1.00		1.00		0.70	0.69		1.09	0.81	
Incremental Delay, d2		0.7	6.0		2.7		4.1	1.5		6.2	0.2	
Delay (s)		18.2	26.5		22.2		12.7	10.3		17.8	8.1	
Level of Service		B	C		C		B	B		B	A	
Approach Delay (s)		23.4			22.2			10.8			9.3	
Approach LOS		C			C			B			A	

Intersection Summary			
HCM Average Control Delay	13.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

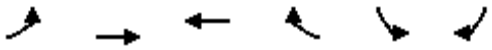
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			5%			-5%	
Total Lost time (s)		4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor		1.00			1.00	1.00		0.95			0.95	
Frpb, ped/bikes		0.99			1.00	0.90		0.98			0.99	
Flpb, ped/bikes		1.00			0.99	1.00		1.00			1.00	
Frt		0.99			1.00	0.85		0.97			0.98	
Flt Protected		0.99			0.98	1.00		1.00			1.00	
Satd. Flow (prot)		1827			1839	1447		3241			3517	
Flt Permitted		0.93			0.74	1.00		0.85			0.79	
Satd. Flow (perm)		1703			1381	1447		2775			2790	
Volume (vph)	46	322	37	108	240	28	108	805	234	27	319	41
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	48	339	39	114	253	29	114	847	246	28	336	43
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	426	0	0	367	29	0	1207	0	0	407	0
Confl. Peds. (#/hr)	53		40	40		53	36		36	36		36
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		2			2			1			1	
Permitted Phases	2			2		2	1			1		
Actuated Green, G (s)		35.0			35.0	35.0		35.0			35.0	
Effective Green, g (s)		36.0			36.0	36.0		36.0			36.0	
Actuated g/C Ratio		0.45			0.45	0.45		0.45			0.45	
Clearance Time (s)		5.0			5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)		766			621	651		1249			1256	
v/s Ratio Prot												
v/s Ratio Perm		0.25			c0.27	0.02		c0.44			0.15	
v/c Ratio		0.56			0.59	0.04		0.97			0.32	
Uniform Delay, d1		16.1			16.5	12.3		21.4			14.2	
Progression Factor		1.00			1.00	1.00		0.52			1.00	
Incremental Delay, d2		2.9			4.1	0.1		16.2			0.7	
Delay (s)		19.0			20.6	12.5		27.3			14.9	
Level of Service		B			C	B		C			B	
Approach Delay (s)		19.0			20.0			27.3			14.9	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	100.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor	0.95	0.95			0.95	1.00		0.95			0.95	
Frpb, ped/bikes	1.00	1.00			1.00	1.00		1.00			0.99	
Flpb, ped/bikes	1.00	1.00			0.98	1.00		1.00			1.00	
Frt	1.00	1.00			1.00	0.85		1.00			0.96	
Flt Protected	0.95	0.96			0.98	1.00		1.00			1.00	
Satd. Flow (prot)	1633	1642			3437	1599		3572			3316	
Flt Permitted	0.68	0.67			0.83	1.00		1.00			1.00	
Satd. Flow (perm)	1171	1156			2916	1599		3572			3316	
Volume (vph)	206	7	0	38	66	67	0	1841	8	0	912	342
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	222	8	0	41	71	72	0	1980	9	0	981	368
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	111	119	0	0	112	72	0	1989	0	0	1349	0
Confl. Peds. (#/hr)				35								16
Heavy Vehicles (%)	5%	5%	5%	1%	1%	1%	1%	1%	1%	3%	3%	3%
Turn Type	Perm			Perm		Perm						
Protected Phases		2			2			1			1	
Permitted Phases	2			2		2						
Actuated Green, G (s)	42.0	42.0			42.0	42.0		68.0			68.0	
Effective Green, g (s)	43.0	43.0			43.0	43.0		69.0			69.0	
Actuated g/C Ratio	0.36	0.36			0.36	0.36		0.57			0.57	
Clearance Time (s)	5.0	5.0			5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)	420	414			1045	573		2054			1907	
v/s Ratio Prot								c0.56			0.41	
v/s Ratio Perm	0.09	c0.10			0.04	0.05						
v/c Ratio	0.26	0.29			0.11	0.13		0.97			0.71	
Uniform Delay, d1	27.3	27.5			25.7	25.9		24.5			18.3	
Progression Factor	1.39	1.38			1.00	1.00		1.00			0.29	
Incremental Delay, d2	1.5	1.7			0.2	0.5		11.1			1.9	
Delay (s)	39.5	39.8			25.9	26.3		35.6			7.2	
Level of Service	D	D			C	C		D			A	
Approach Delay (s)		39.7			26.1			35.6			7.2	
Approach LOS		D			C			D			A	

Intersection Summary			
HCM Average Control Delay	25.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Grade (%)		0%	0%		-10%	
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	0.95		0.97	1.00
Frt	1.00	1.00	1.00		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1787	3574	3505		3640	1679
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1787	3574	3505		3640	1679
Volume (vph)	247	1866	977	0	561	233
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	247	1866	977	0	561	233
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	247	1866	977	0	561	233
Heavy Vehicles (%)	1%	1%	3%	3%	1%	1%
Turn Type	Prot					Perm
Protected Phases	2	6	1		3	
Permitted Phases						3
Actuated Green, G (s)	21.0	81.0	55.0		29.0	29.0
Effective Green, g (s)	22.0	82.0	56.0		30.0	30.0
Actuated g/C Ratio	0.18	0.68	0.47		0.25	0.25
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	328	2442	1636		910	420
v/s Ratio Prot	0.14	c0.52	0.28		c0.15	
v/s Ratio Perm						0.14
v/c Ratio	0.75	0.76	0.60		0.62	0.55
Uniform Delay, d1	46.4	12.6	23.7		39.9	39.2
Progression Factor	0.70	0.13	0.25		1.00	1.00
Incremental Delay, d2	7.3	1.1	1.0		3.1	5.2
Delay (s)	39.8	2.7	6.9		43.0	44.4
Level of Service	D	A	A		D	D
Approach Delay (s)		7.0	6.9		43.4	
Approach LOS		A	A		D	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL2	EBL	EBT	EBR	WBL	WBT	WBR	WBR2	NBL	NBT	NBR	NBR2
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			0%			-5%				0%		
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0			4.0	4.0		
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.91			0.91	0.91		
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00			1.00	0.99		
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00		
Frt	1.00	1.00	1.00	0.85	1.00	0.98			1.00	0.96		
Flt Protected	0.95	0.95	1.00	1.00	0.95	1.00			0.95	0.98		
Satd. Flow (prot)	1787	1787	3574	1599	1807	5125			1626	3194		
Flt Permitted	0.18	0.95	1.00	1.00	0.13	1.00			0.95	0.98		
Satd. Flow (perm)	336	1787	3574	1599	248	5125			1626	3194		
Volume (vph)	68	452	1434	329	27	998	93	32	395	139	52	61
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	70	466	1478	339	28	1029	96	33	407	143	54	63
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	70	466	1478	339	28	1158	0	0	228	439	0	0
Confl. Peds. (#/hr)					22							15
Heavy Vehicles (%)	1%	1%	1%	1%	2%	2%	2%	2%	1%	1%	1%	1%
Turn Type	custom	Prot		Perm	Perm				Split			
Protected Phases		1	6			2			4	4		
Permitted Phases	1			6	2							
Actuated Green, G (s)	21.4	21.4	56.1	56.1	29.7	29.7			22.3	22.3		
Effective Green, g (s)	22.4	22.4	57.1	57.1	30.7	30.7			23.3	23.3		
Actuated g/C Ratio	0.18	0.18	0.45	0.45	0.24	0.24			0.18	0.18		
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0			5.0	5.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	59	315	1608	719	60	1240			299	586		
v/s Ratio Prot		c0.26	c0.41			0.23			c0.14	0.14		
v/s Ratio Perm	0.21			0.21	0.11							
v/c Ratio	1.19	1.48	0.92	0.47	0.47	0.93			0.76	0.75		
Uniform Delay, d1	52.2	52.2	32.7	24.4	41.1	47.1			49.2	49.0		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00			1.00	1.00		
Incremental Delay, d2	176.3	232.1	10.0	2.2	23.9	14.0			10.9	5.2		
Delay (s)	228.5	284.4	42.7	26.6	65.0	61.1			60.1	54.3		
Level of Service	F	F	D	C	E	E			E	D		
Approach Delay (s)			93.8			61.2				56.3		
Approach LOS			F			E				E		

Intersection Summary			
HCM Average Control Delay	75.0	HCM Level of Service	E
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	126.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	107.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Movement	SBL2	SBL	SBT	SBR	SWL2	SWL	SWR	SWR2
Lane Configurations								
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)			0%			0%		
Total Lost time (s)		4.0	4.0			4.0	4.0	
Lane Util. Factor		0.95	0.95			1.00	0.88	
Frpb, ped/bikes		1.00	0.99			1.00	0.94	
Flpb, ped/bikes		1.00	1.00			1.00	1.00	
Frt		1.00	0.97			1.00	0.85	
Flt Protected		0.95	0.99			0.95	1.00	
Satd. Flow (prot)		1698	1697			1787	2636	
Flt Permitted		0.95	0.99			0.95	1.00	
Satd. Flow (perm)		1698	1697			1787	2636	
Volume (vph)	44	241	129	49	33	42	245	23
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	45	248	133	51	34	43	253	24
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	239	238	0	0	77	277	0
Confl. Peds. (#/hr)				18				76
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type	Split	Split			Split		pm+ov	
Protected Phases	3	3	3		8	8	1	
Permitted Phases							8	
Actuated Green, G (s)		21.7	21.7			6.8	28.2	
Effective Green, g (s)		22.7	22.7			7.8	30.2	
Actuated g/C Ratio		0.18	0.18			0.06	0.24	
Clearance Time (s)		5.0	5.0			5.0	5.0	
Vehicle Extension (s)		3.0	3.0			3.0	3.0	
Lane Grp Cap (vph)		304	304			110	710	
v/s Ratio Prot		c0.14	0.14			c0.04	0.07	
v/s Ratio Perm							0.04	
v/c Ratio		0.79	0.78			0.70	0.39	
Uniform Delay, d1		49.8	49.7			58.4	40.6	
Progression Factor		1.00	1.00			1.00	1.00	
Incremental Delay, d2		12.6	12.4			18.2	0.4	
Delay (s)		62.3	62.1			76.6	41.0	
Level of Service		E	E			E	D	
Approach Delay (s)			62.2			48.7		
Approach LOS			E			D		

Intersection Summary

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#8 NE 50th St & 30th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/10/2004*	Analysis Year	*2015 PM w/ Signal at QFC Dwy*
Analysis Time Period	*5:00 pm*		

Project Description *QFC U-Village Access Study - #2400*

East/West Street: *NE 50th Street* | North/South Street: *30th Ave NE*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*0*	*475*	*110*	*30*	*347*	*0*
Peak-Hour Factor, PHF	*1.00*	*0.92*	*0.92*	*0.92*	*0.92*	*1.00*
Hourly Flow Rate, HFR	*0*	*516*	*119*	*32*	*377*	*0*
Percent Heavy Vehicles	*0*	--	--	*1*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration			*TR*	*LT*		
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*32*	*0*	*35*	*0*	*0*	*0*
Peak-Hour Factor, PHF	*0.92*	*1.00*	*0.92*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*34*	*0*	*38*	*0*	*0*	*0*
Percent Heavy Vehicles	*2*	*0*	*2*	*0*	*0*	*0*
Percent Grade (%)		*-10*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration		*LR*				

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration		*LT*		*LR*				
v (vph)		*32*		*72*				
C (m) (vph)		*949*		*347*				
v/c		*0.03*		*0.21*				
95% queue length		*0.10*		*0.77*				
Control Delay		*8.9*		*18.1*				
LOS		*A*		*C*				
Approach Delay	--	--		*18.1*				
Approach LOS	--	--		*C*				

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#9 NE Blakeley & 30th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/10/2004*	Analysis Year	*2015 PM w/Signal at QFC dwy*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study #2400*
East/West Street: *NE Blakeley St*	North/South Street: *30th Ave NE*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*9*	*301*		*0*	*303*	*209*
Peak-hour factor, PHF	*0.92*	*0.92*	*1.00*	*1.00*	*0.92*	*0.92*
Hourly Flow Rate (veh/h)	*9*	*327*	*0*	*0*	*329*	*227*
Proportion of heavy vehicles, P_{HV}	*1*	--	--	*0*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*1*	*0*	*0*	*1*	*0*
Configuration	*LT*					*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*77*	*0*	*16*
Peak-hour factor, PHF	*1.00*	*1.00*	*1.00*	*0.92*	*1.00*	*0.92*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*83*	*0*	*17*
Proportion of heavy vehicles, P_{HV}	*0*	*1*	*0*	*0*	*1*	*1*
Percent grade (%)		*0*			*-10*	
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*LT*						*LR*	
Volume, v (vph)	*9*						*100*	
Capacity, c_m (vph)	*1020*						*389*	
v/c ratio	*0.01*						*0.26*	
Queue length (95%)	*0.03*						*1.01*	
Control Delay (s/veh)	*8.6*						*17.4*	
LOS	*A*						*C*	
Approach delay (s/veh)	--	--				*17.4*		
Approach LOS	--	--				*C*		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#10 SW Dwy & 25th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/15/2004*	Analysis Year	*2015 PM w/ signal at QFC dwy*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study - #2400*
East/West Street: *SW U-Village Dwy*	North/South Street: *25th Ave NE*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

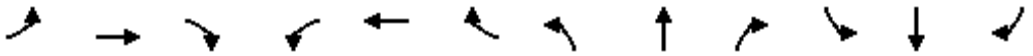
Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*0*	*1090*	*211*	*0*	*575*	*0*
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR	*0*	*1147*	*222*	*0*	*605*	*0*
Percent Heavy Vehicles	*0*	--	--	*1*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*		*T*	
Upstream Signal		*1*			*1*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*68*	*0*	*61*	*0*	*0*	*0*
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*71*	*0*	*64*	*0*	*0*	*0*
Percent Heavy Vehicles	*3*	*0*	*3*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration			*L*		*R*			
v (vph)			*71*		*64*			
C (m) (vph)			*272*		*772*			
v/c			*0.26*		*0.08*			
95% queue length			*1.02*		*0.27*			
Control Delay			*22.8*		*10.1*			
LOS			*C*		*B*			
Approach Delay	--	--	*16.8*					
Approach LOS	--	--	*C*					



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0		4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor				1.00		1.00	1.00	0.95		1.00	1.00	
Frpb, ped/bikes				1.00		0.88	1.00	0.99		1.00	1.00	
Flpb, ped/bikes				1.00		1.00	0.97	1.00		0.99	1.00	
Frt				1.00		0.85	1.00	0.98		1.00	0.99	
Flt Protected				0.95		1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)				1787		1413	1713	3442		1755	1847	
Flt Permitted				0.95		1.00	0.45	1.00		0.19	1.00	
Satd. Flow (perm)				1787		1413	805	3442		359	1847	
Volume (vph)	0	0	0	126	0	224	7	980	137	171	423	15
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	131	0	233	7	1021	143	178	441	16
RTOR Reduction (vph)	0	0	0	0	0	92	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	131	0	142	7	1164	0	178	457	0
Confl. Peds. (#/hr)						80	35		28	28		35
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	2%	2%	2%	2%	2%	2%
Turn Type				Prot		custom	Perm			Perm		
Protected Phases				2				1			1	
Permitted Phases						2	1			1		
Actuated Green, G (s)				19.0		19.0	51.0	51.0		51.0	51.0	
Effective Green, g (s)				20.0		20.0	52.0	52.0		52.0	52.0	
Actuated g/C Ratio				0.25		0.25	0.65	0.65		0.65	0.65	
Clearance Time (s)				5.0		5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)				447		353	523	2237		233	1201	
v/s Ratio Prot				0.07				0.34			0.25	
v/s Ratio Perm						c0.10	0.01			c0.50		
v/c Ratio				0.29		0.40	0.01	0.52		0.76	0.38	
Uniform Delay, d1				24.3		25.0	4.9	7.4		9.7	6.5	
Progression Factor				1.00		1.00	1.00	1.00		0.90	0.40	
Incremental Delay, d2				1.7		3.4	0.0	0.9		20.4	0.9	
Delay (s)				25.9		28.4	5.0	8.3		29.1	3.5	
Level of Service				C		C	A	A		C	A	
Approach Delay (s)		0.0			27.5			8.3			10.7	
Approach LOS		A			C			A			B	

Intersection Summary			
HCM Average Control Delay	12.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#12 NW U-Vil Dwy & 25th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/15/2004*	Analysis Year	*2015 PM w/ signal at QFC dwy*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study - #2400*
East/West Street: *NW U-Village Dwy*	North/South Street: *25th Ave NE*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*1*	*1213*	*11*	*80*	*581*	*7*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR	*1*	*1276*	*11*	*84*	*611*	*7*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*1*	*0*
Configuration	*L*	*T*	*TR*	*L*		*TR*
Upstream Signal		*1*			*1*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*29*	*0*	*113*	*37*	*0*	*17*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR	*30*	*0*	*118*	*38*	*0*	*17*
Percent Heavy Vehicles	*1*	*1*	*1*	*2*	*2*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*1*	*0*
Configuration	*L*		*R*		*LTR*	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*	*L*		*R*		*LTR*	
v (vph)	*1*	*84*	*30*		*118*		*55*	
C (m) (vph)	*813*	*504*	*95*		*578*		*222*	
v/c	*0.00*	*0.17*	*0.32*		*0.20*		*0.25*	
95% queue length	*0.00*	*0.59*	*1.21*		*0.76*		*0.95*	
Control Delay	*9.4*	*13.6*	*59.5*		*12.8*		*26.5*	
LOS	*A*	*B*	*F*		*B*		*D*	
Approach Delay	--	--	*22.3*			*26.5*		
Approach LOS	--	--	*C*			*D*		

Version 4.1d

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#13 NE 45th & S (RIRO) Dwy*
Agency/Co.		Jurisdiction	
Date Performed	*11/10/2004*	Analysis Year	*2015 PM with Signal at SE Dwy*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study #2400*
East/West Street: *NE 45th St*	North/South Street: *South RIRO U-Village Dwy*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

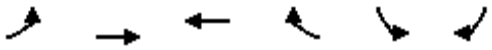
Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*0*	*632*	*62*
Peak-hour factor, PHF	*0.98*	*0.98*	*1.00*	*1.00*	*0.98*	*0.98*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*0*	*644*	*63*
Proportion of heavy vehicles, P_{HV}	*2*	--	--	*0*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration						*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*0*	*0*	*147*
Peak-hour factor, PHF	*1.00*	*1.00*	*1.00*	*0.98*	*1.00*	*0.98*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*0*	*0*	*149*
Proportion of heavy vehicles, P_{HV}	*0*	*0*	*0*	*1*	*0*	*1*
Percent grade (%)		*0*			*0*	
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
Volume, v (vph)								*149*
Capacity, c_m (vph)								*453*
v/c ratio								*0.33*
Queue length (95%)								*1.42*
Control Delay (s/veh)								*16.8*
LOS								*C*
Approach delay (s/veh)	--	--				*16.8*		
Approach LOS	--	--				*C*		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	0.95	*0.73		1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.99		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1770	3539	4012		1787	1599
Flt Permitted	0.95	1.00	1.00		0.95	1.00
Satd. Flow (perm)	1770	3539	4012		1787	1599
Volume (vph)	248	2136	1552	117	76	119
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	251	2158	1568	118	77	120
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	251	2158	1686	0	77	120
Confl. Peds. (#/hr)				20		
Heavy Vehicles (%)	2%	2%	2%	2%	1%	1%
Turn Type	Prot					pm+ov
Protected Phases	1	6	2		7	1
Permitted Phases						7
Actuated Green, G (s)	21.0	87.0	61.0		23.0	44.0
Effective Green, g (s)	22.0	88.0	62.0		24.0	46.0
Actuated g/C Ratio	0.18	0.73	0.52		0.20	0.38
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Lane Grp Cap (vph)	325	2595	2073		357	666
v/s Ratio Prot	0.14	c0.61	0.42		c0.04	0.03
v/s Ratio Perm						0.04
v/c Ratio	0.77	0.83	0.81		0.22	0.18
Uniform Delay, d1	46.6	10.9	24.2		40.1	24.5
Progression Factor	0.90	0.66	1.00		1.00	1.00
Incremental Delay, d2	11.3	2.2	3.6		1.4	0.6
Delay (s)	53.2	9.5	27.8		41.5	25.1
Level of Service	D	A	C		D	C
Approach Delay (s)		14.0	27.8		31.5	
Approach LOS		B	C		C	

Intersection Summary			
HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#15 NE QFC Dwy & 30th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/10/2004*	Analysis Year	*2015 PM w/Signal at QFC Dwy*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study - #2400*
East/West Street: *NE QFC Dwy*	North/South Street: *30th Ave NE*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*57*	*372*	*0*	*0*	*264*	*98*
Peak-Hour Factor, PHF	*0.93*	*0.93*	*1.00*	*1.00*	*0.93*	*0.93*
Hourly Flow Rate, HFR	*61*	*399*	*0*	*0*	*283*	*105*
Percent Heavy Vehicles	*1*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*1*	*0*	*0*	*1*	*0*
Configuration	*L*	*T*				*TR*
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*0*	*0*	*0*	*190*	*0*	*116*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.93*	*1.00*	*0.93*
Hourly Flow Rate, HFR	*0*	*0*	*0*	*204*	*0*	*124*
Percent Heavy Vehicles	*0*	*0*	*0*	*1*	*0*	*1*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*					*L*		*R*
v (vph)	*61*					*204*		*124*
C (m) (vph)	*1170*					*310*		*704*
v/c	*0.05*					*0.66*		*0.18*
95% queue length	*0.16*					*4.35*		*0.64*
Control Delay	*8.2*					*36.4*		*11.2*
LOS	*A*					*E*		*B*
Approach Delay	--	--				*26.9*		
Approach LOS	--	--				*D*		

Appendix B:

Queue Demand Calculations at University Village Access Driveways – 2015 with Access Scenario C PM Peak Hour

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#10 SW Dwy & 25th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/15/2004*	Analysis Year	*2015 PM w/ signal at QFC dwy*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study - #2400*
East/West Street: *SW U-Village Dwy*	North/South Street: *25th Ave NE*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*0*	*1090*	*211*	*0*	*575*	*0*
Peak-Hour Factor, PHF	*1.00*	*0.95*	*0.95*	*0.95*	*0.95*	*1.00*
Hourly Flow Rate, HFR	*0*	*1147*	*222*	*0*	*605*	*0*
Percent Heavy Vehicles	*0*	--	--	*1*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*	*TR*		*T*	
Upstream Signal		*1*			*1*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*68*	*0*	*61*	*0*	*0*	*0*
Peak-Hour Factor, PHF	*0.95*	*1.00*	*0.95*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR	*71*	*0*	*64*	*0*	*0*	*0*
Percent Heavy Vehicles	*3*	*0*	*3*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration			*L*		*R*			
v (vph)			*71*		*64*			
C (m) (vph)			*272*		*772*			
v/c			*0.26*		*0.08*			
95% queue length			*1.02*		*0.27*			
Control Delay			*22.8*		*10.1*			
LOS			*C*		*B*			
Approach Delay	--	--	*16.8*					
Approach LOS	--	--	*C*					

Lane Group	WBL	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	131	233	7	1164	178	457
v/c Ratio	0.29	0.52	0.01	0.52	0.76	0.38
Control Delay	26.5	17.2	5.1	8.4	33.9	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.5	17.2	5.1	8.4	33.9	3.6
Queue Length 50th (ft)	53	45	1	141	41	29
Queue Length 95th (ft)	100	114	5	186	#174	50
Internal Link Dist (ft)				583		278
Turn Bay Length (ft)			200		200	
Base Capacity (vph)	447	445	523	2239	233	1201
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.52	0.01	0.52	0.76	0.38

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#12 NW U-Vil Dwy & 25th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/15/2004*	Analysis Year	*2015 PM w/ signal at QFC dwy*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study - #2400*
East/West Street: *NW U-Village Dwy*	North/South Street: *25th Ave NE*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*1*	*1213*	*11*	*80*	*581*	*7*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR	*1*	*1276*	*11*	*84*	*611*	*7*
Percent Heavy Vehicles	*2*	--	--	*2*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*1*	*1*	*0*
Configuration	*L*	*T*	*TR*	*L*		*TR*
Upstream Signal		*1*			*1*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*29*	*0*	*113*	*37*	*0*	*17*
Peak-Hour Factor, PHF	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*	*0.95*
Hourly Flow Rate, HFR	*30*	*0*	*118*	*38*	*0*	*17*
Percent Heavy Vehicles	*1*	*1*	*1*	*2*	*2*	*2*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*1*	*0*
Configuration	*L*		*R*		*LTR*	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*	*L*	*L*		*R*		*LTR*	
v (vph)	*1*	*84*	*30*		*118*		*55*	
C (m) (vph)	*813*	*504*	*95*		*578*		*222*	
v/c	*0.00*	*0.17*	*0.32*		*0.20*		*0.25*	
95% queue length	*0.00*	*0.59*	*1.21*		*0.76*		*0.95*	
Control Delay	*9.4*	*13.6*	*59.5*		*12.8*		*26.5*	
LOS	*A*	*B*	*F*		*B*		*D*	
Approach Delay	--	--	*22.3*			*26.5*		
Approach LOS	--	--	*C*			*D*		

Version 4.1d

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#13 NE 45th & S (RIRO) Dwy*
Agency/Co.		Jurisdiction	
Date Performed	*11/10/2004*	Analysis Year	*2015 PM with Signal at SE Dwy*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study #2400*
East/West Street: *NE 45th St*	North/South Street: *South RIRO U-Village Dwy*
Intersection Orientation: *East-West*	Study Period (hrs): *0.25*

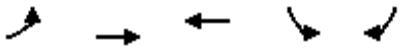
Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*0*	*632*	*62*
Peak-hour factor, PHF	*0.98*	*0.98*	*1.00*	*1.00*	*0.98*	*0.98*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*0*	*644*	*63*
Proportion of heavy vehicles, P_{HV}	*2*	--	--	*0*	--	--
Median type	*Undivided*					
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*1*	*0*
Configuration						*TR*
Upstream Signal		*0*			*0*	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*0*	*0*	*0*	*0*	*0*	*147*
Peak-hour factor, PHF	*1.00*	*1.00*	*1.00*	*0.98*	*1.00*	*0.98*
Hourly Flow Rate (veh/h)	*0*	*0*	*0*	*0*	*0*	*149*
Proportion of heavy vehicles, P_{HV}	*0*	*0*	*0*	*1*	*0*	*1*
Percent grade (%)		*0*			*0*	
Flared approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized?			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*1*
Configuration						*R*

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
Volume, v (vph)								*149*
Capacity, c_m (vph)								*453*
v/c ratio								*0.33*
Queue length (95%)								*1.42*
Control Delay (s/veh)								*16.8*
LOS								*C*
Approach delay (s/veh)	--	--				*16.8*		
Approach LOS	--	--				*C*		



Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Group Flow (vph)	251	2158	1686	77	120
v/c Ratio	0.77	0.83	0.81	0.22	0.18
Control Delay	54.1	9.8	28.2	42.1	23.0
Queue Delay	0.0	1.0	0.0	0.0	0.0
Total Delay	54.1	10.8	28.2	42.1	23.0
Queue Length 50th (ft)	184	288	479	50	58
Queue Length 95th (ft)	m#277	298	565	95	100
Internal Link Dist (ft)		277	226	73	
Turn Bay Length (ft)	250				75
Base Capacity (vph)	325	2595	2074	357	666
Starvation Cap Reductn	0	203	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.77	0.90	0.81	0.22	0.18

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*TENW*	Intersection	*#15 NE QFC Dwy & 30th Ave NE*
Agency/Co.		Jurisdiction	
Date Performed	*11/10/2004*	Analysis Year	*2015 PM w/Signal at QFC Dwy*
Analysis Time Period	*5:00 pm*		

Project Description	*QFC U-Village Access Study - #2400*
East/West Street: *NE QFC Dwy*	North/South Street: *30th Ave NE*
Intersection Orientation: *North-South*	Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*57*	*372*	*0*	*0*	*264*	*98*
Peak-Hour Factor, PHF	*0.93*	*0.93*	*1.00*	*1.00*	*0.93*	*0.93*
Hourly Flow Rate, HFR	*61*	*399*	*0*	*0*	*283*	*105*
Percent Heavy Vehicles	*1*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*1*	*0*	*0*	*1*	*0*
Configuration	*L*	*T*				*TR*
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*0*	*0*	*0*	*190*	*0*	*116*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*0.93*	*1.00*	*0.93*
Hourly Flow Rate, HFR	*0*	*0*	*0*	*204*	*0*	*124*
Percent Heavy Vehicles	*0*	*0*	*0*	*1*	*0*	*1*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*1*	*0*	*1*
Configuration				*L*		*R*

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*					*L*		*R*
v (vph)	*61*					*204*		*124*
C (m) (vph)	*1170*					*310*		*704*
v/c	*0.05*					*0.66*		*0.18*
95% queue length	*0.16*					*4.35*		*0.64*
Control Delay	*8.2*					*36.4*		*11.2*
LOS	*A*					*E*		*B*
Approach Delay	--	--				*26.9*		
Approach LOS	--	--				*D*		

Appendix C:

Signal Warrant Analysis

Signal Warrant Analysis for Access Scenario C

A signal warrant analysis was conducted to determine whether the intersection of NE 45th Street/SE QFC Driveway meets signal warrants under 2004 existing conditions.

The signal warrant analysis conducted at the intersection of NE 45th Street/SE QFC Driveway was based on traffic signal warrants as outlined in the US Department of Transportation/Federal Highway Administration, *Manual on Uniform Traffic Control Devices* (MUTCD), 2003 Edition. Of the eight signal warrants outlined in the MUTCD, only Warrant 3 (Peak Hour) was analyzed.

The MUTCD states that at an intersection with a high volume of left-turn traffic from the major street, the signal warrant analysis may be performed in a manner that considers the higher of the major-street left-turn volume as the "minor-street" volume and the corresponding single direction of opposing traffic on the major street as the "major street" volume. The signal warrant analysis at the NE 45th Street/SE QFC Driveway was conducted using this approach.

The MUTCD also states that the satisfaction of a traffic signal warrant or warrants shall not in itself require the installation of a traffic signal. However, the satisfaction of one or more warrants does indicate that the installation of a traffic signal should be considered and/or investigated further.

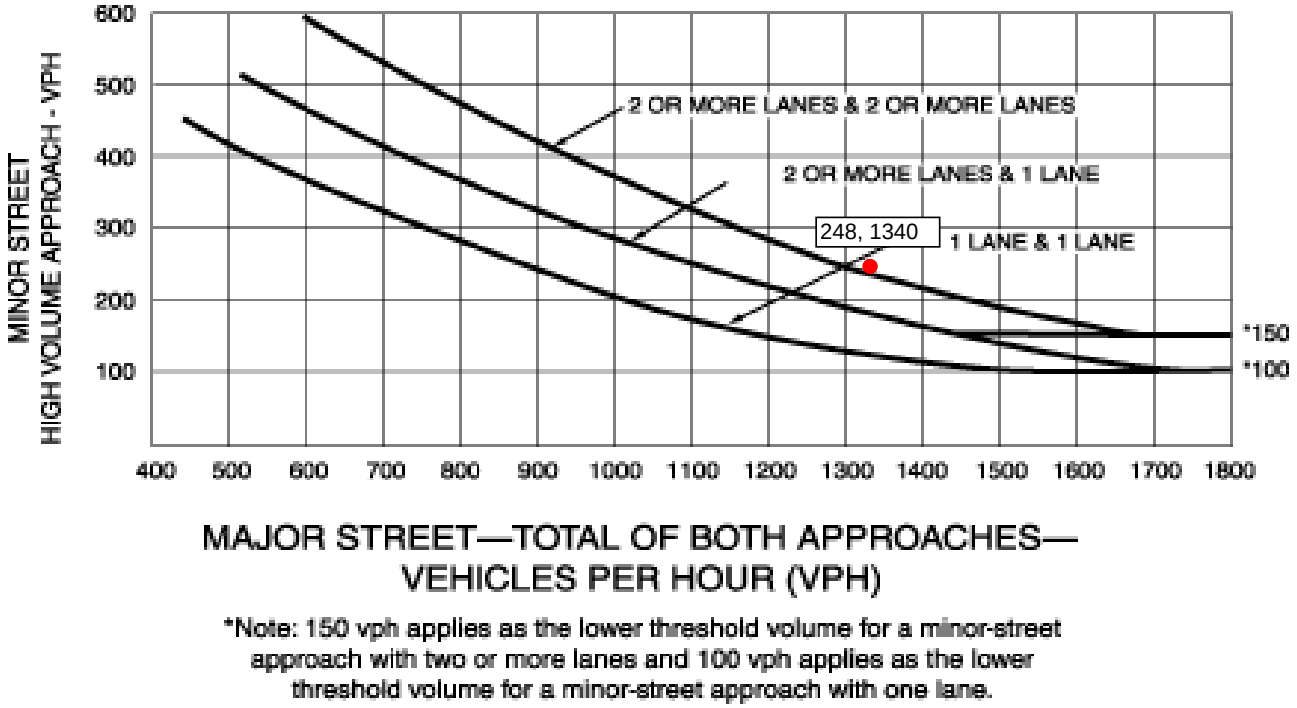
The intersection of NE 45th Street/SE QFC Driveway meets Warrant 3 (the peak hour signal warrant) for existing year 2004 conditions. Therefore, the intersection would also be anticipated to meet Warrant 3 under future year 2015 conditions. The detailed signal warrant calculation sheets are included in this **Appendix C**.

QFC U-Village Access Study
TENW Project No. 2400

Signal Warrant Analysis for NE 45th Street/SE QFC Dwy
2004 Existing with Alternate Approach methodology - left-turn traffic vs. opposing thru traffic

Warrant 3 - Peak Hour
Condition B

Figure 4C-3. Warrant 3, Peak Hour



*Note: 150 vph applies as the lower threshold volume for a minor-street approach with two or more lanes and 100 vph applies as the lower threshold volume for a minor-street approach with one lane.

WARRANT MET (2) = YES

Notes:
(1) The highest hourly minor/major approach volumes are based on the existing 2004 traffic counts conducted on 10/13/04.
(2) The signal warrant is satisfied when the conditions given below exist for one hour of an average day.

MUTCD Warrant Requirements
Warrant 3: Peak Hour - Condition B
The plotted point representing the vehicles per hour on the major street (total of both approaches) and the corresponding vehicles per hour on the higher-volume minor street approach (one direction only) for 1 hour of an average day falls above the applicable curve in Figure 4C-3 for the existing combination of approach lanes.
NOTE:
This signal warrant shall only be applied in unusual cases. Such cases include, but are not limited to, office complexes, manufacturing plants, industrial complexes, or high-occupancy vehicle facilities that attract or discharge large numbers of vehicles over a short time.