

Traffic Impact Report  
for Vernon Avenue  
Townhomes

Edina, MN

**Wenck File #3022-01**

Prepared for:

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February 4, 2013



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## 1.0 Executive Summary

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The purpose of this Traffic Impact Report is to evaluate the traffic impacts of the proposed Vernon Avenue Townhomes development located in Edina, MN. The project site is located on the south side of 49<sup>th</sup> Street east of Brookside Avenue.

Based on direction from City of Edina staff, this study examined weekday a.m. and p.m. peak hour traffic impacts of the proposed development on the following intersections:

- Vernon Avenue/Interlachen Boulevard
- Interlachen Boulevard/Brookside Avenue
- Brookside Avenue/49<sup>th</sup> Street

### Proposed Development Characteristics

The proposed project will involve the construction of 17 new townhomes. The existing single family house and 9 rental apartment units will be removed and replaced by the proposed townhomes. Access for the development will be via a single driveway on 49<sup>th</sup> Street, which will provide full movement access. The project is expected to be complete by the end of 2014.

The conclusions drawn from the information and analyses presented in this report are as follows:

- The proposed development is expected to generate 1 net trip during the weekday a.m. peak hour, 2 net trips during the weekday p.m. peak hour, and 29 net weekday daily trips.
- All of the analyzed intersections have adequate capacity with existing geometrics and control to accommodate the proposed development. No improvements are needed at these intersections to accommodate the proposed project.
- The maximum southbound vehicle queue lengths at the Vernon Avenue/Interlachen Boulevard intersection do not interfere with operations at the Interlachen Boulevard/Brookside Avenue intersection under 2015 Build conditions.
- The maximum westbound queue at the Interlachen Boulevard/Brookside Avenue intersection does not result in any operational issues.
- The proposed project is located in a neighborhood that has only one roadway access point to the surrounding street system. The neighborhood is bound by the creek on the north, T.H. 100 on the east, and Vernon Avenue on the south. In addition, railroad tracks are located immediately east of Brookside Avenue. A review of the entire neighborhood area did not reveal an obvious location for a secondary access. If a train was stopped on the tracks for an excessive amount of time, additional steps would be needed to access the neighborhood.

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## 2.0 Purpose and Background

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The purpose of this Traffic Impact Report is to evaluate the traffic impacts of the proposed Vernon Avenue Townhomes development located in Edina, MN. The project site is located on the south side of 49<sup>th</sup> Street east of Brookside Avenue. The project location is shown in **Figure 1**.

Based on direction from City of Edina staff, this study examined weekday a.m. and p.m. peak hour traffic impacts of the proposed development on the following intersections:

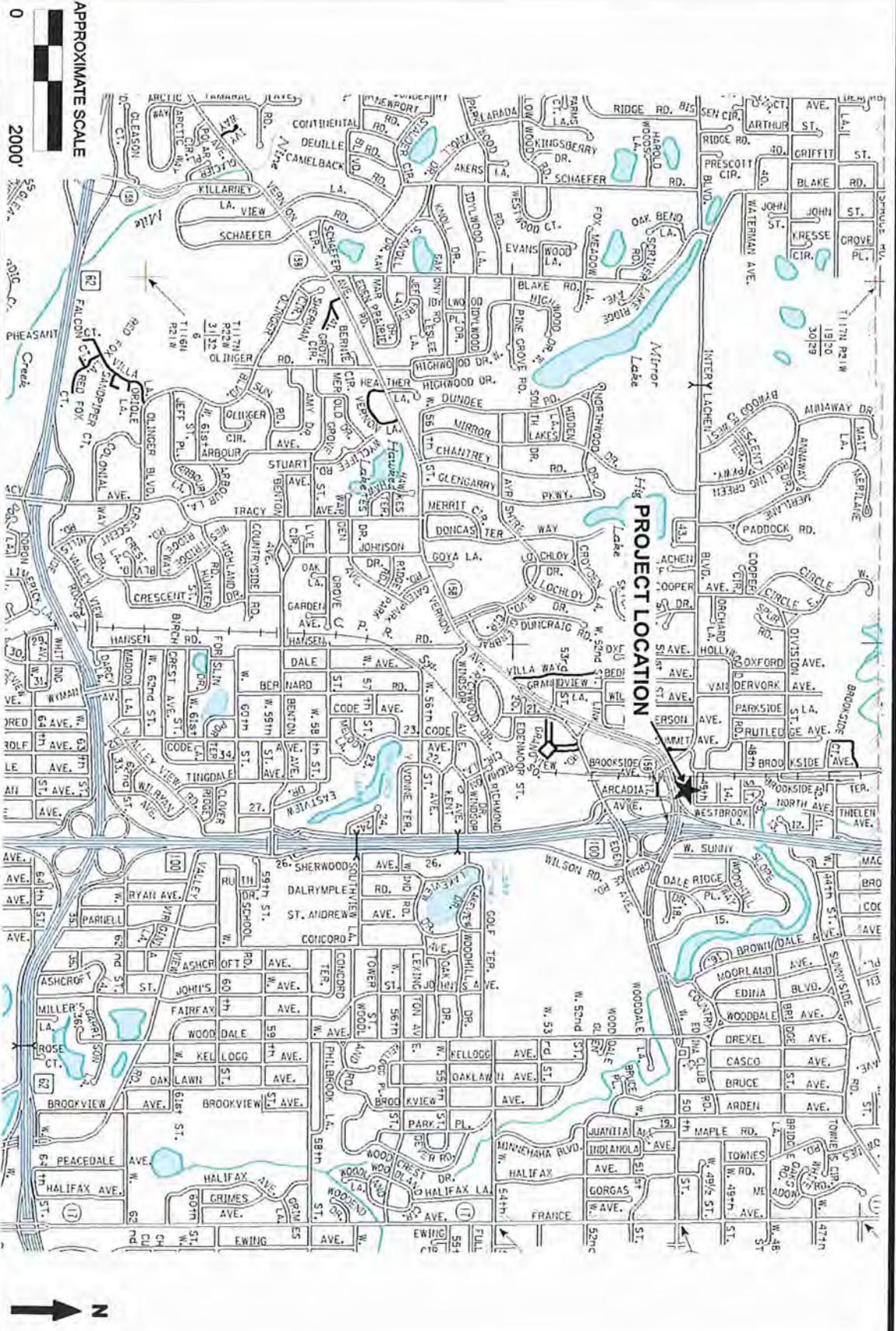
- Vernon Avenue/Interlachen Boulevard
- Interlachen Boulevard/Brookside Avenue
- Brookside Avenue/49<sup>th</sup> Street

### Proposed Development Characteristics

The proposed project will involve the construction of 17 new townhomes. The existing single family house and 9 rental apartment units will be removed and replaced by the proposed townhomes.

Access for the development will be via a single driveway on 49<sup>th</sup> Street, which will provide full movement access. The current site plan is shown in **Figure 2**. The project is expected to be complete by the end of 2014.

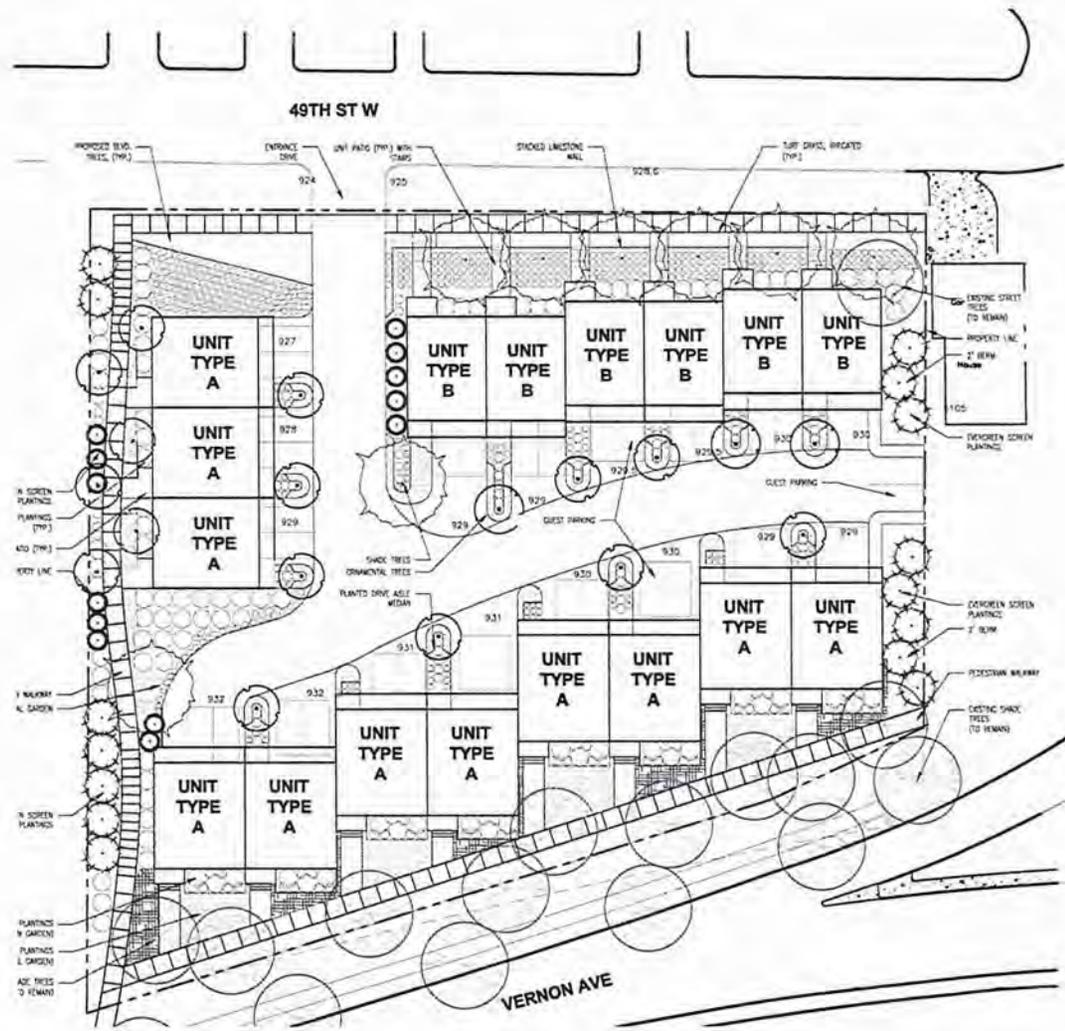
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TRAFFIC IMPACT REPORT  
FOR VERNON AVENUE TOWNHOMES  
IN EDINA, MN

FIGURE 1  
PROJECT LOCATION



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APPROXIMATE SCALE



TRAFFIC IMPACT REPORT  
FOR VERNON AVENUE TOWNHOMES  
IN EDINA, MN

FIGURE 2  
PRELIMINARY SITE PLAN

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## 3.0 Existing Conditions

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The proposed site currently consists of one single family home and nine rental apartments. The project site is bounded by existing single family homes to the east, 49<sup>th</sup> Street to the north, railroad tracks to the west, and Vernon Avenue to the south.

Near the site location, 49<sup>th</sup> Street is a two-lane undivided local roadway. Brookside Avenue is also a two-lane undivided roadway near the site location. Interlachen Boulevard is a two-lane undivided roadway with turn lanes at Brookside Avenue and Vernon Avenue. Vernon Avenue is a four-lane divided roadway with turn lanes at major intersections. Existing conditions at the proposed project location are shown in **Figure 3** and described below.

### Vernon Avenue/Interlachen Boulevard

The signalized intersection provides one left turn/through lane and one through/right turn lane on the westbound approach. The eastbound approach consists of one left turn lane, one through lane, and one through/right turn lane. The northbound and southbound approaches consist of one left turn lane and one through/right turn lane. Striped crosswalks and pedestrian signal heads are present at this intersection.

### Interlachen Boulevard/Brookside Avenue

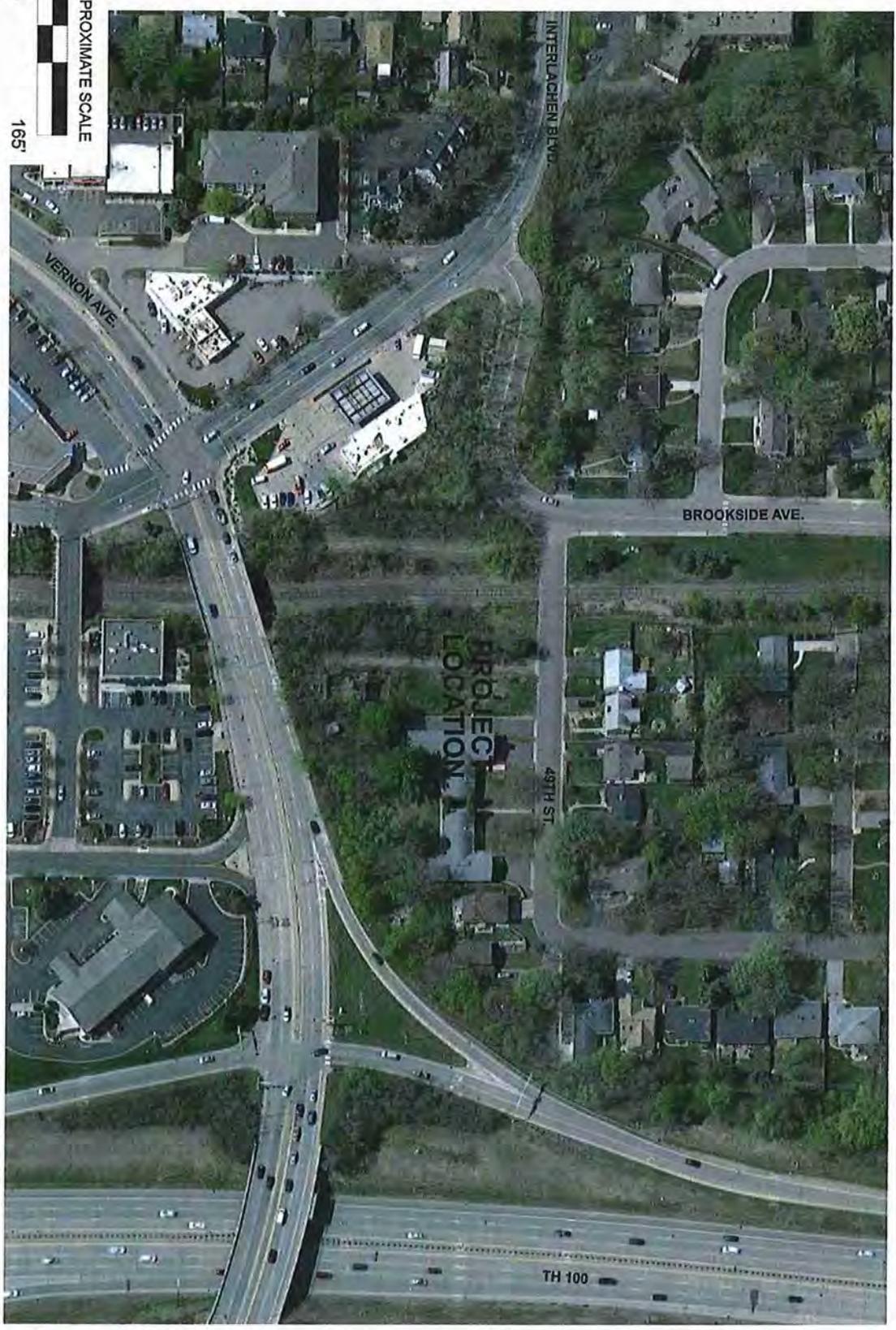
The three-way intersection is controlled with a stop sign on the westbound Brookside Avenue approach. The southbound approach consists of one left/through lane. The northbound approach consists of one through lane and one right turn lane. The westbound approach consists of one shared left turn/right turn lane. A bike lane is present on the northbound approach.

### Brookside Avenue/49<sup>th</sup> Street

This three-way intersection is controlled with a stop sign on the westbound approach. The westbound approach consists of one shared left turn/right turn lane. The northbound approach consists of one through/right turn lane. The southbound approach consists of one left turn/through lane.

Turn movement data for the intersections was collected during the weekday a.m. (7:00 - 9:00 a.m.) and p.m. (4:00 - 6:00 p.m.) peak periods in January 2013.

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FOR VERNON AVENUE TOWNHOMES  
IN EDINA, MN**

**FIGURE 3  
EXISTING CONDITIONS**

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## 4.0 Traffic Forecasts

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### Traffic Forecast Scenarios

To adequately address the impacts of the proposed project, forecasts and analyses were completed for the year 2015. Specifically, weekday a.m. and p.m. peak hour traffic forecasts were completed for the following scenarios:

- *2013 Existing.* Existing volumes were determined through traffic counts at the subject intersections. The existing volume information includes trips generated by the uses currently on the site.
- *2015 No-Build.* Existing volumes at the subject intersections were increased by 1.0 percent per year to determine 2015 No-Build volumes. The 1.0 percent per year growth rate was calculated based on both recent growth experienced near the site and projected growth in the area.
- *2015 Build.* Trips generated by the proposed development were added to the 2015 No-Build volumes to determine 2015 Build volumes. In addition, existing trips generated by the uses currently on the site were subtracted from the total volume.

### Trip Generation

Weekday a.m. and p.m. peak hour trip generation for the existing and proposed developments were calculated based on data presented in the ninth edition of Trip Generation, published by the Institute of Transportation Engineers (ITE). The resultant trip generation estimates are shown in **Table 1**.

**Table 1**  
**Net Trip Generation for Proposed Project**

Use (land use code)	Size	Unit	Peak Hour Trips Generated			Daily Total
			In	Out	Total	
<b>A.M. Peak Hour</b>						
<b>Proposed Project</b>						
Residential Townhouse (230)	17	DU	1	6	7	99
<b>Existing Uses Removed</b>						
Single-Family Detached Housing (210)	1	DU	(0)	(1)	(1)	(10)
Apartment (220)	9	DU	(1)	(4)	(5)	(60)
<b>Net Total Added by Project</b>			<b>0</b>	<b>1</b>	<b>1</b>	<b>29</b>
<b>P.M. Peak Hour</b>						
<b>Proposed Project</b>						
Residential Townhouse (230)	17	DU	6	3	9	99
<b>Existing Uses Removed</b>						
Single-Family Detached Housing (210)	1	DU	(1)	(0)	(1)	(10)
Apartment (220)	9	DU	(4)	(2)	(6)	(60)
<b>Net Total Added by Project</b>			<b>1</b>	<b>1</b>	<b>2</b>	<b>29</b>

Notes: DU=dwelling unit

Table 1 shows the net number of trips generated by the proposed development including reductions for existing trips. As shown, the project adds 1 net trip during the a.m. peak hour, 2 net trips during the p.m. peak hour, and 29 net trips daily.

Trip Distribution Percentages

Trip distribution percentages for the subject development trips were established based on the nearby roadway network, existing and expected future traffic patterns, and location of the subject development in relation to major attractions and population concentrations.

The distribution percentages for trips generated by the proposed development are as follows:

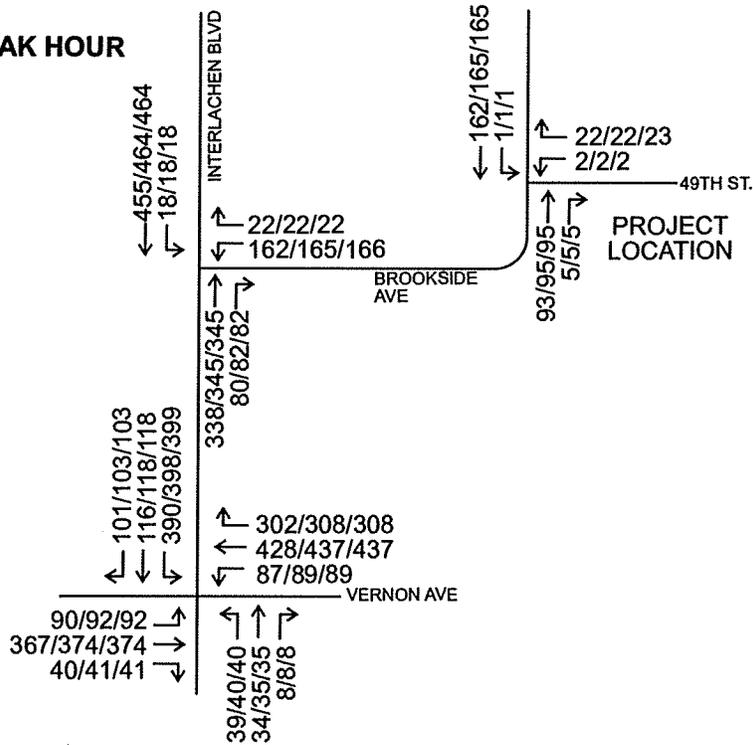
- 60 percent to/from the east on Vernon Avenue
- 10 percent to/from the north on Brookside Avenue
- 10 percent to/from the west on Interlachen Boulevard
- 10 percent to/from the west on Vernon Avenue
- 10 percent to/from the south on Interlachen Boulevard

Traffic Volumes

Development trips were assigned to the surrounding roadway network using the preceding trip distribution percentages. Traffic volumes were established for all the forecasting scenarios described earlier during the weekday a.m. and p.m. peak hours. The resultant traffic volumes are presented in **Figure 4**.

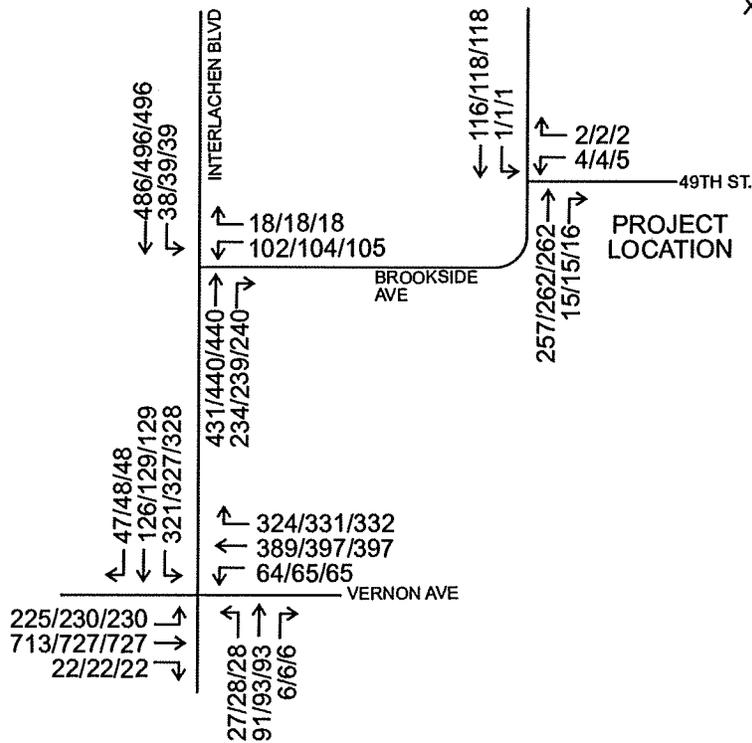
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**A.M. PEAK HOUR**



EXISTING 2013  
2014 NO BUILD  
2014 BUILD  
XX/XX/XX

**P.M. PEAK HOUR**



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FOR VERNON AVENUE  
TOWNHOMES IN EDINA, MN

**FIGURE 4**  
**WEEKDAY A.M. AND P.M.**  
**PEAK HOUR TRAFFIC**  
**VOLUMES**

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## 5.0 Traffic Analysis

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### Intersection Level of Service Analysis

Traffic analyses were completed for the subject intersections for all scenarios described earlier during the weekday a.m. and p.m. peak hours using Synchro software. Initial analysis was completed using existing geometrics, control, and signal timing.

Capacity analysis results are presented in terms of level of service (LOS), which is defined in terms of traffic delay at the intersection. LOS ranges from A to F. LOS A represents the best intersection operation, with little delay for each vehicle using the intersection. LOS F represents the worst intersection operation with excessive delay. The following is a detailed description of the conditions described by each LOS designation:

- Level of service A corresponds to a free flow condition with motorists virtually unaffected by the intersection control mechanism. For a signalized or an unsignalized intersection, the average delay per vehicle would be approximately 10 seconds or less.
- Level of service B represents stable flow with a high degree of freedom, but with some influence from the intersection control device and the traffic volumes. For a signalized intersection, the average delay ranges from 10 to 20 seconds. An unsignalized intersection would have delays ranging from 10 to 15 seconds for this level.
- Level of service C depicts a restricted flow which remains stable, but with significant influence from the intersection control device and the traffic volumes. The general level of comfort and convenience changes noticeably at this level. The delay ranges from 20 to 35 seconds for a signalized intersection and from 15 to 25 seconds for an unsignalized intersection at this level.
- Level of service D corresponds to high-density flow in which speed and freedom are significantly restricted. Though traffic flow remains stable, reductions in comfort and convenience are experienced. The control delay for this level is 35 to 55 seconds for a signalized intersection and 25 to 35 seconds for an unsignalized intersection.
- Level of service E represents unstable flow of traffic at or near the capacity of the intersection with poor levels of comfort and convenience. The delay ranges from 55 to 80 seconds for a signalized intersection and from 35 to 50 seconds for an unsignalized intersection at this level.
- Level of service F represents forced flow in which the volume of traffic approaching the intersection exceeds the volume that can be served. Characteristics often experienced include long queues, stop-and-go waves, poor travel times, low comfort and convenience,

and increased accident exposure. Delays over 80 seconds for a signalized intersection and over 50 seconds for an unsignalized intersection correspond to this level of service.

The LOS results for the study intersections are presented in **Figure 5** and discussed below.

*Vernon Avenue/Interlachen Boulevard (signalized)* - During the a.m. peak hour under existing conditions, all movements except the eastbound left turn operate at LOS D or better. The eastbound left turn movement operates at LOS E. Under the 2015 No-Build and 2015 Build conditions, all movements except the eastbound and southbound left turns operate at LOS D or better. The eastbound and southbound left turn movements operate at LOS E. The overall intersection operates at LOS C for all scenarios.

During the p.m. peak hour under existing, 2015 No-Build, and 2015 Build conditions, all movements except the eastbound and southbound left turns operate at LOS D or better. The eastbound and southbound left turns operate at LOS E under all three conditions. The overall intersection operates at LOS C under all scenarios.

The traffic generated by the proposed development has minimal impact on the intersection operations and does not change the level of service of any movement. No improvements are needed at this intersection to accommodate the proposed project.

*Interlachen Boulevard/Brookside Avenue (westbound stop controlled)* - During the a.m. and p.m. peak hours under existing, 2015 No-Build, and 2015 Build conditions, all movements operate at LOS D or better.

The traffic generated by the proposed development has minimal impact on the intersection operations and does not change the level of service of any movement. No improvements are needed at this intersection to accommodate the proposed project.

*Brookside Avenue/49<sup>th</sup> Street (westbound stop controlled)* - During the a.m. and p.m. peak hours under existing, 2015 No-Build, and 2015 Build conditions, all movements operate at LOS B or better.

The traffic generated by the proposed development has minimal impact on the intersection operations and does not change the level of service of any movement. No improvements are needed at this intersection to accommodate the proposed project.

### Vehicle Queue Length Impacts

Vehicle queue lengths were reviewed to determine if any intersection blocking issues are expected. The expected maximum and average queues were determined with the SimTraffic software. By definition, the maximum queue occurs once during the one hour simulation time period. The average queue is the average of all the queue lengths during the simulation time period and therefore happens more frequently.

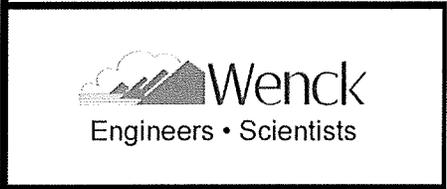
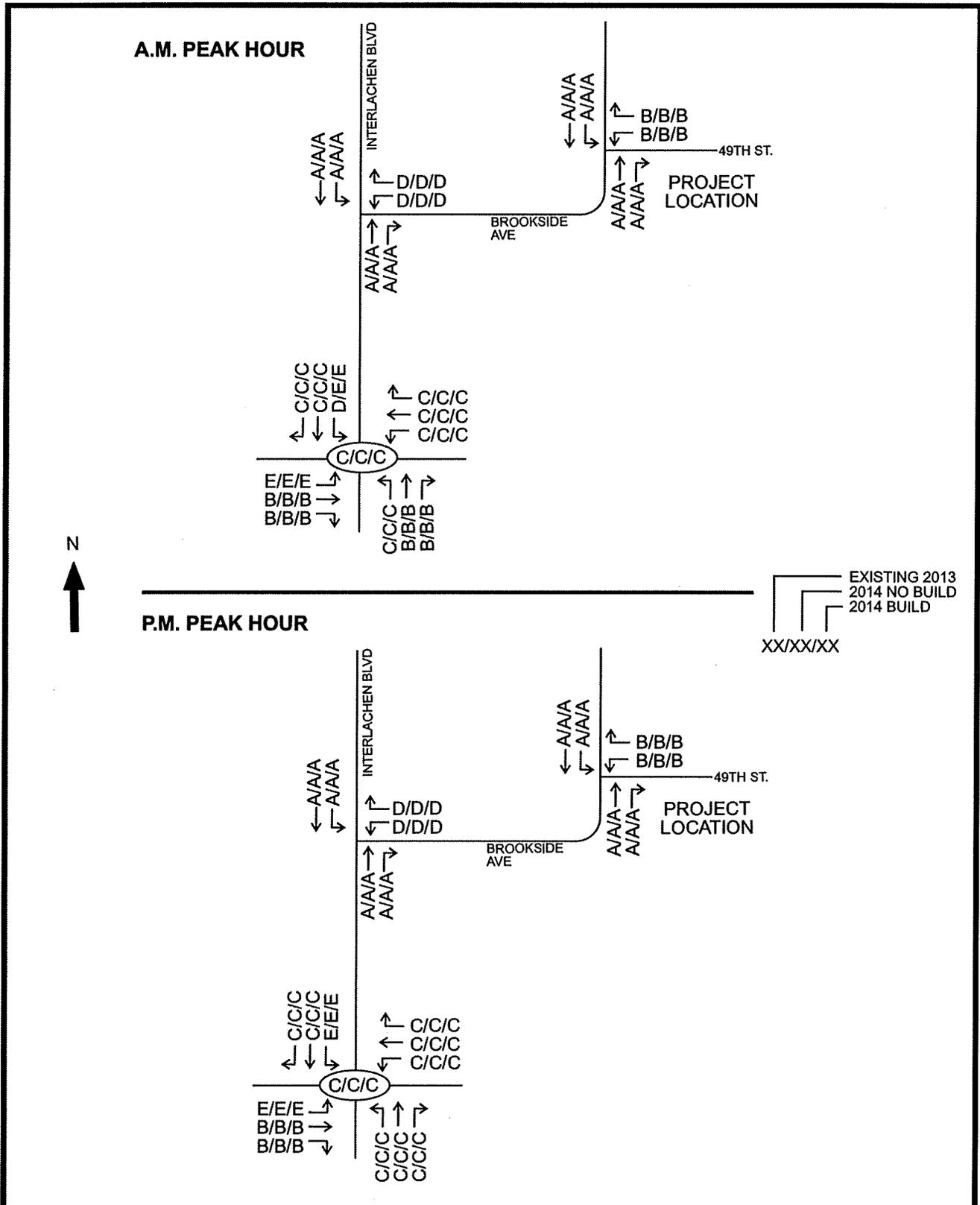
The southbound left turn and through/right turn queues at the Vernon Avenue/Interlachen Boulevard intersection were reviewed to determine if they impact operations at the Interlachen Boulevard/Brookside Avenue intersection. Under existing conditions, there is approximately 370 feet of available queuing space on Interlachen Boulevard between Vernon Avenue and Brookside Avenue. Under the 2015 Build condition during the a.m. peak hour, the maximum southbound queue is 356 feet and the average queue is 213 feet. Under the 2015 Build condition during the p.m. peak hour, the maximum southbound queue is 362 feet and the average queue is 203 feet. The maximum queue length is shorter than the available 370 feet and therefore does not block the intersection.

The forecasted southbound queue lengths are similar to those witnessed in the field during data collection. Even though the southbound queue came close to the Interlachen Boulevard/Brookside Avenue intersection, operations at the intersection were not greatly impacted. In addition, the southbound queues were able to clear onto Vernon Avenue during every signal cycle, which minimized the overall delays.

The westbound queue at the Interlachen Boulevard/Brookside Avenue intersection was also reviewed. Under the 2015 Build condition during the a.m. peak hour, the maximum westbound queue is 212 feet and the average queue is 79 feet. Under the 2015 Build condition during the p.m. peak hour, the maximum westbound queue is 197 feet and the average queue is 79 feet. Once again, these queue lengths are similar to those witnessed during the data collection. The queues at this intersection did not result in any operational issues.

### Railroad Crossing Impacts

The proposed project is located in a neighborhood that has only one roadway access point to the surrounding street system. All vehicle traffic for this neighborhood must enter and exit via 49<sup>th</sup> Street at Brookside Avenue. The neighborhood is bound by the creek on the north, T.H. 100 on the east, and Vernon Avenue on the south. In addition, railroad tracks are located immediately east of Brookside Avenue. Therefore, when a train is traveling through the area, all vehicle accessing the neighborhood must wait for the train to pass. A review of the entire neighborhood area did not reveal an obvious location for a secondary access. If a train was stopped on the tracks for an excessive amount of time, additional steps would be needed to access the neighborhood.



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FOR VERNON AVENUE  
TOWNHOMES IN EDINA, MN

**FIGURE 5**  
**WEEKDAY A.M. AND P.M.**  
**PEAK HOUR LEVEL OF**  
**SERVICE RESULTS**

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## 6.0 Conclusions and Recommendations

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The conclusions drawn from the information and analyses presented in this report are as follows:

- The proposed development is expected to generate 1 net trip during the weekday a.m. peak hour, 2 net trips during the weekday p.m. peak hour, and 29 net weekday daily trips.
- All of the analyzed intersections have adequate capacity with existing geometrics and control to accommodate the proposed development. No improvements are needed at these intersections to accommodate the proposed project.
- The maximum southbound vehicle queue lengths at the Vernon Avenue/Interlachen Boulevard intersection do not interfere with operations at the Interlachen Boulevard/Brookside Avenue intersection under 2015 Build conditions.
- The maximum westbound queue at the Interlachen Boulevard/Brookside Avenue intersection does not result in any operational issues.
- The proposed project is located in a neighborhood that has only one roadway access point to the surrounding street system. The neighborhood is bound by the creek on the north, T.H. 100 on the east, and Vernon Avenue on the south. In addition, railroad tracks are located immediately east of Brookside Avenue. A review of the entire neighborhood area did not reveal an obvious location for a secondary access. If a train was stopped on the tracks for an excessive amount of time, additional steps would be needed to access the neighborhood.

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## 7.0 Appendix

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- Level of Service Worksheets

Lanes, Volumes, Timings  
7: Interlachen Blvd & Vernon Ave

1/31/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	2>	0	0	<2>	0	1	1>	0	1	1>	0
Volume (vph)	90	367	40	87	428	302	39	34	8	390	116	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	0		0	60		0	275		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	3486	0	0	3328	0	1770	1809	0	1770	1732	0
Flt Permitted	0.950				0.826		0.532			0.727		
Satd. Flow (perm)	1770	3486	0	0	2763	0	991	1809	0	1354	1732	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			130			9			48	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		498			675			490			431	
Travel Time (s)		11.3			15.3			11.1			9.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	98	442	0	0	888	0	42	46	0	424	236	0
Turn Type	Prot	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			4			4	
Permitted Phases				2			4			4		
Total Split (s)	15.0	60.0		45.0	45.0		45.0	45.0		45.0	45.0	
Total Lost Time (s)	5.5	5.5			5.5		5.5	5.5		5.5	5.5	
Act Effct Green (s)	9.3	57.2			42.4		36.8	36.8		36.8	36.8	
Actuated g/C Ratio	0.09	0.54			0.40		0.35	0.35		0.35	0.35	
v/c Ratio	0.63	0.23			0.74		0.12	0.07		0.89	0.37	
Control Delay	64.4	12.9			27.9		22.8	18.3		54.8	21.1	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	64.4	12.9			27.9		22.8	18.3		54.8	21.1	
LOS	E	B			C		C	B		D	C	
Approach Delay		22.2			27.9			20.4			42.7	
Approach LOS		C			C			C			D	
Queue Length 50th (ft)	64	78			238		18	16		255	88	
Queue Length 95th (ft)	#132	110			322		43	40		#429	151	
Internal Link Dist (ft)		418			595			410			351	
Turn Bay Length (ft)	125						60			275		
Base Capacity (vph)	162	1907			1194		372	686		509	681	
Starvation Cap Reductn	0	0			0		0	0		0	0	
Spillback Cap Reductn	0	0			0		0	0		0	0	
Storage Cap Reductn	0	0			0		0	0		0	0	
Reduced v/c Ratio	0.60	0.23			0.74		0.11	0.07		0.83	0.35	

Intersection Summary

Area Type: Other  
 Cycle Length: 105  
 Actuated Cycle Length: 105  
 Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBT, Start of Green  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.89  
 Intersection Signal Delay: 30.7  
 Intersection Capacity Utilization 81.6%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service D

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HCM Unsignalized Intersection Capacity Analysis  
 4: Interlachen Blvd & Brookside Ave

1/31/2013

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lanes	1>	0	0	<1	1	1
Volume (veh/h)	162	22	18	455	338	80
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	176	24	20	495	367	87
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					431	
pX, platoon unblocked						
vC, conflicting volume	901	367	454			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	901	367	454			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	42	96	98			
cM capacity (veh/h)	303	678	1106			

Direction, Lane #	WB 1	SE 1	NW 1	NW 2
Volume Total	200	514	367	87
Volume Left	176	20	0	0
Volume Right	24	0	0	87
cSH	325	1106	1700	1700
Volume to Capacity	0.62	0.02	0.22	0.05
Queue Length 95th (ft)	96	1	0	0
Control Delay (s)	32.4	0.5	0.0	0.0
Lane LOS	D	A		
Approach Delay (s)	32.4	0.5	0.0	
Approach LOS	D			

Intersection Summary			
Average Delay		5.8	
Intersection Capacity Utilization		55.5%	ICU Level of Service
Analysis Period (min)		15	B

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# HCM Unsignalized Intersection Capacity Analysis

## 6: Brookside Ave & 49th St

1/31/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lanes	1>	0	1>	0	0	<1
Volume (veh/h)	22	2	93	5	1	162
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	2	101	5	1	176
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	282	104			107	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	282	104			107	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	707	951			1484	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	26	107	177
Volume Left	24	0	1
Volume Right	2	5	0
cSH	723	1700	1484
Volume to Capacity	0.04	0.06	0.00
Queue Length 95th (ft)	3	0	0
Control Delay (s)	10.2	0.0	0.1
Lane LOS	B		A
Approach Delay (s)	10.2	0.0	0.1
Approach LOS	B		

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		19.3%	ICU Level of Service
Analysis Period (min)		15	A

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Lanes, Volumes, Timings  
7: Interlachen Blvd & Vernon Ave

1/31/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	2>	0	0	<2>	0	1	1>	0	1	1>	0
Volume (vph)	92	374	41	89	437	308	40	35	8	398	118	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	0		0	60		0	275		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	3486	0	0	3328	0	1770	1809	0	1770	1732	0
Flt Permitted	0.950				0.823		0.529			0.726		
Satd. Flow (perm)	1770	3486	0	0	2753	0	985	1809	0	1352	1732	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			130			9			48	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		498			675			490			431	
Travel Time (s)		11.3			15.3			11.1			9.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	100	452	0	0	907	0	43	47	0	433	240	0
Turn Type	Prot	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			4			4	
Permitted Phases				2			4			4		
Total Split (s)	15.0	60.0		45.0	45.0		45.0	45.0		45.0	45.0	
Total Lost Time (s)	5.5	5.5			5.5		5.5	5.5		5.5	5.5	
Act Effct Green (s)	9.3	56.7			41.9		37.3	37.3		37.3	37.3	
Actuated g/C Ratio	0.09	0.54			0.40		0.36	0.36		0.36	0.36	
v/c Ratio	0.64	0.24			0.77		0.12	0.07		0.90	0.37	
Control Delay	65.2	13.1			29.3		22.8	18.3		55.5	21.1	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	65.2	13.1			29.3		22.8	18.3		55.5	21.1	
LOS	E	B			C		C	B		E	C	
Approach Delay		22.5			29.3			20.4			43.2	
Approach LOS		C			C			C			D	
Queue Length 50th (ft)	66	81			247		19	16		263	90	
Queue Length 95th (ft)	#135	112			334		43	41		#443	154	
Internal Link Dist (ft)		418			595			410			351	
Turn Bay Length (ft)	125						60			275		
Base Capacity (vph)	162	1890			1176		370	686		508	681	
Starvation Cap Reductn	0	0			0		0	0		0	0	
Spillback Cap Reductn	0	0			0		0	0		0	0	
Storage Cap Reductn	0	0			0		0	0		0	0	
Reduced v/c Ratio	0.62	0.24			0.77		0.12	0.07		0.85	0.35	

Intersection Summary

Area Type: Other  
 Cycle Length: 105  
 Actuated Cycle Length: 105  
 Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBT, Start of Green  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.90  
 Intersection Signal Delay: 31.5  
 Intersection Capacity Utilization 83.2%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service E

A82

HCM Unsignalized Intersection Capacity Analysis  
 4: Interlachen Blvd & Brookside Ave

1/31/2013

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lanes	1>	0	0	<1	1	1
Volume (veh/h)	165	22	18	464	345	82
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	179	24	20	504	375	89
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					431	
pX, platoon unblocked						
vC, conflicting volume	918	375	464			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	918	375	464			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	39	96	98			
cM capacity (veh/h)	296	671	1097			

Direction, Lane #	WB 1	SE 1	NW 1	NW 2
Volume Total	203	524	375	89
Volume Left	179	20	0	0
Volume Right	24	0	0	89
cSH	317	1097	1700	1700
Volume to Capacity	0.64	0.02	0.22	0.05
Queue Length 95th (ft)	104	1	0	0
Control Delay (s)	34.6	0.5	0.0	0.0
Lane LOS	D	A		
Approach Delay (s)	34.6	0.5	0.0	
Approach LOS	D			

Intersection Summary			
Average Delay		6.1	
Intersection Capacity Utilization		56.1%	ICU Level of Service
Analysis Period (min)		15	B

A83

HCM Unsignalized Intersection Capacity Analysis  
 6: Brookside Ave & 49th St

1/31/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lanes	1>	0	1>	0	0	<1
Volume (veh/h)	22	2	95	5	1	165
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	2	103	5	1	179
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	288	106			109	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	288	106			109	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	702	948			1482	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	26	109	180
Volume Left	24	0	1
Volume Right	2	5	0
cSH	718	1700	1482
Volume to Capacity	0.04	0.06	0.00
Queue Length 95th (ft)	3	0	0
Control Delay (s)	10.2	0.0	0.1
Lane LOS	B		A
Approach Delay (s)	10.2	0.0	0.1
Approach LOS	B		

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		19.5%	ICU Level of Service
Analysis Period (min)		15	A

A84

Lanes, Volumes, Timings  
7: Interlachen Blvd & Vernon Ave

1/31/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	2>	0	0	<2>	0	1	1>	0	1	1>	0
Volume (vph)	92	374	41	89	437	308	40	35	8	399	118	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	0		0	60		0	275		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	3486	0	0	3328	0	1770	1809	0	1770	1732	0
Flt Permitted	0.950				0.823		0.529			0.726		
Satd. Flow (perm)	1770	3486	0	0	2753	0	985	1809	0	1352	1732	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			130			9			48	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		498			675			490			431	
Travel Time (s)		11.3			15.3			11.1			9.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	100	452	0	0	907	0	43	47	0	434	240	0
Turn Type	Prot	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			4			4	
Permitted Phases				2			4			4		
Total Split (s)	15.0	60.0		45.0	45.0		45.0	45.0		45.0	45.0	
Total Lost Time (s)	5.5	5.5			5.5		5.5	5.5		5.5	5.5	
Act Effct Green (s)	9.3	56.7			41.8		37.3	37.3		37.3	37.3	
Actuated g/C Ratio	0.09	0.54			0.40		0.36	0.36		0.36	0.36	
v/c Ratio	0.64	0.24			0.77		0.12	0.07		0.90	0.37	
Control Delay	65.2	13.1			29.4		22.8	18.3		55.7	21.1	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	65.2	13.1			29.4		22.8	18.3		55.7	21.1	
LOS	E	B			C		C	B		E	C	
Approach Delay		22.5			29.4			20.4			43.4	
Approach LOS		C			C			C			D	
Queue Length 50th (ft)	66	81			247		19	16		264	90	
Queue Length 95th (ft)	#135	112			334		43	41		#446	154	
Internal Link Dist (ft)		418			595			410			351	
Turn Bay Length (ft)	125						60			275		
Base Capacity (vph)	162	1888			1175		370	686		508	681	
Starvation Cap Reductn	0	0			0		0	0		0	0	
Spillback Cap Reductn	0	0			0		0	0		0	0	
Storage Cap Reductn	0	0			0		0	0		0	0	
Reduced v/c Ratio	0.62	0.24			0.77		0.12	0.07		0.85	0.35	

Intersection Summary

Area Type: Other  
 Cycle Length: 105  
 Actuated Cycle Length: 105  
 Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBT, Start of Green  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.90  
 Intersection Signal Delay: 31.5  
 Intersection Capacity Utilization 83.2%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service E

AB5

# HCM Unsignalized Intersection Capacity Analysis

## 4: Interlachen Blvd & Brookside Ave

1/31/2013

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lanes	1>	0	0	<1	1	1
Volume (veh/h)	166	22	18	464	345	82
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	180	24	20	504	375	89
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					431	
pX, platoon unblocked						
vC, conflicting volume	918	375	464			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	918	375	464			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	39	96	98			
cM capacity (veh/h)	296	671	1097			

Direction, Lane #	WB 1	SE 1	NW 1	NW 2
Volume Total	204	524	375	89
Volume Left	180	20	0	0
Volume Right	24	0	0	89
cSH	317	1097	1700	1700
Volume to Capacity	0.65	0.02	0.22	0.05
Queue Length 95th (ft)	105	1	0	0
Control Delay (s)	34.9	0.5	0.0	0.0
Lane LOS	D	A		
Approach Delay (s)	34.9	0.5	0.0	
Approach LOS	D			

Intersection Summary			
Average Delay		6.2	
Intersection Capacity Utilization		56.2%	ICU Level of Service
Analysis Period (min)		15	B

AS6

HCM Unsignalized Intersection Capacity Analysis  
 6: Brookside Ave & 49th St

1/31/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lanes	1>	0	1>	0	0	<1
Volume (veh/h)	23	2	95	5	1	165
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	2	103	5	1	179
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	288	106			109	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	288	106			109	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	96	100			100	
cM capacity (veh/h)	702	948			1482	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	27	109	180
Volume Left	25	0	1
Volume Right	2	5	0
cSH	717	1700	1482
Volume to Capacity	0.04	0.06	0.00
Queue Length 95th (ft)	3	0	0
Control Delay (s)	10.2	0.0	0.1
Lane LOS	B		A
Approach Delay (s)	10.2	0.0	0.1
Approach LOS	B		

Intersection Summary			
Average Delay		0.9	
Intersection Capacity Utilization		19.5%	ICU Level of Service
Analysis Period (min)		15	A

A87

Lanes, Volumes, Timings  
7: Interlachen Blvd & Vernon Ave

1/31/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	2>	0	0	<2>	0	1	1>	0	1	1>	0
Volume (vph)	225	713	22	64	389	324	27	91	6	321	126	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	0		0	60		0	275		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	3525	0	0	3303	0	1770	1846	0	1770	1788	0
Flt Permitted	0.950				0.800		0.585			0.691		
Satd. Flow (perm)	1770	3525	0	0	2653	0	1090	1846	0	1287	1788	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			189			3			19	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		498			675			490			431	
Travel Time (s)		11.3			15.3			11.1			9.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	237	774	0	0	817	0	28	102	0	338	182	0
Turn Type	Prot	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			4			4	
Permitted Phases				2			4			4		
Total Split (s)	24.0	66.0		42.0	42.0		39.0	39.0		39.0	39.0	
Total Lost Time (s)	5.5	5.5			5.5		5.5	5.5		5.5	5.5	
Act Effct Green (s)	17.3	62.9			40.1		31.1	31.1		31.1	31.1	
Actuated g/C Ratio	0.16	0.60			0.38		0.30	0.30		0.30	0.30	
v/c Ratio	0.81	0.37			0.72		0.09	0.19		0.89	0.34	
Control Delay	64.3	11.8			26.2		26.1	26.7		61.0	26.9	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	64.3	11.8			26.2		26.1	26.7		61.0	26.9	
LOS	E	B			C		C	C		E	C	
Approach Delay		24.1			26.2			26.6			49.1	
Approach LOS		C			C			C			D	
Queue Length 50th (ft)	153	138			201		13	48		209	82	
Queue Length 95th (ft)	#268	178			281		35	89		#363	141	
Internal Link Dist (ft)		418			595			410			351	
Turn Bay Length (ft)	125						60			275		
Base Capacity (vph)	311	2115			1131		347	591		410	583	
Starvation Cap Reductn	0	0			0		0	0		0	0	
Spillback Cap Reductn	0	0			0		0	0		0	0	
Storage Cap Reductn	0	0			0		0	0		0	0	
Reduced v/c Ratio	0.76	0.37			0.72		0.08	0.17		0.82	0.31	

Intersection Summary

Area Type: Other  
 Cycle Length: 105  
 Actuated Cycle Length: 105  
 Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBT, Start of Green  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.89  
 Intersection Signal Delay: 30.2  
 Intersection Capacity Utilization 81.6%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service D

A88

HCM Unsignalized Intersection Capacity Analysis  
 4: Interlachen Blvd & Brookside Ave

1/31/2013

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lanes	1>	0	0	<1	1	1
Volume (veh/h)	102	18	38	486	431	234
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	109	19	40	517	459	249
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					431	
pX, platoon unblocked						
vC, conflicting volume	1056	459	707			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1056	459	707			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	54	97	95			
cM capacity (veh/h)	238	602	891			

Direction, Lane #	WB 1	SE 1	NW 1	NW 2
Volume Total	128	557	459	249
Volume Left	109	40	0	0
Volume Right	19	0	0	249
cSH	262	891	1700	1700
Volume to Capacity	0.49	0.05	0.27	0.15
Queue Length 95th (ft)	62	4	0	0
Control Delay (s)	31.2	1.2	0.0	0.0
Lane LOS	D	A		
Approach Delay (s)	31.2	1.2	0.0	
Approach LOS	D			

Intersection Summary			
Average Delay		3.3	
Intersection Capacity Utilization		67.1%	ICU Level of Service
Analysis Period (min)		15	C

AB1

HCM Unsignalized Intersection Capacity Analysis  
 6: Brookside Ave & 49th St

1/31/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lanes	1>	0	1>	0	0	<1
Volume (veh/h)	4	2	257	15	1	116
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	14	2	306	18	1	138
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	455	315			324	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	455	315			324	
tC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	562	726			1236	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	17	324	139
Volume Left	14	0	1
Volume Right	2	18	0
cSH	581	1700	1236
Volume to Capacity	0.03	0.19	0.00
Queue Length 95th (ft)	2	0	0
Control Delay (s)	11.4	0.0	0.1
Lane LOS	B		A
Approach Delay (s)	11.4	0.0	0.1
Approach LOS	B		

Intersection Summary			
Average Delay		0.4	
Intersection Capacity Utilization		24.4%	ICU Level of Service
Analysis Period (min)		15	A

A90

Lanes, Volumes, Timings  
7: Interlachen Blvd & Vernon Ave

1/31/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	2>	0	0	<2>	0	1	1>	0	1	1>	0
Volume (vph)	230	727	22	65	397	331	28	93	6	327	129	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	0		0	60		0	275		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	3525	0	0	3303	0	1770	1846	0	1770	1786	0
Flt Permitted	0.950				0.797		0.578			0.690		
Satd. Flow (perm)	1770	3525	0	0	2643	0	1077	1846	0	1285	1786	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			189			3			19	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		498			675			490			431	
Travel Time (s)		11.3			15.3			11.1			9.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	242	788	0	0	834	0	29	104	0	344	187	0
Turn Type	Prot	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			4			4	
Permitted Phases				2			4			4		
Total Spill (s)	24.0	66.0		42.0	42.0		39.0	39.0		39.0	39.0	
Total Lost Time (s)	5.5	5.5			5.5		5.5	5.5		5.5	5.5	
Act Effct Green (s)	17.4	62.6			39.7		31.4	31.4		31.4	31.4	
Actuated g/C Ratio	0.17	0.60			0.38		0.30	0.30		0.30	0.30	
v/c Ratio	0.83	0.37			0.75		0.09	0.19		0.90	0.34	
Control Delay	65.3	12.0			27.4		26.2	26.6		61.9	27.0	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	65.3	12.0			27.4		26.2	26.6		61.9	27.0	
LOS	E	B			C		C	C		E	C	
Approach Delay		24.5			27.4			26.5			49.6	
Approach LOS		C			C			C			D	
Queue Length 50th (ft)	157	142			209		14	49		214	85	
Queue Length 95th (ft)	#277	182			292		36	90		#373	144	
Internal Link Dist (ft)		418			595			410			351	
Turn Bay Length (ft)	125						60			275		
Base Capacity (vph)	311	2103			1116		343	591		409	582	
Starvation Cap Reductn	0	0			0		0	0		0	0	
Spillback Cap Reductn	0	0			0		0	0		0	0	
Storage Cap Reductn	0	0			0		0	0		0	0	
Reduced v/c Ratio	0.78	0.37			0.75		0.08	0.18		0.84	0.32	

Intersection Summary

Area Type: Other  
 Cycle Length: 105  
 Actuated Cycle Length: 105  
 Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBT, Start of Green  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.90  
 Intersection Signal Delay: 30.8  
 Intersection Capacity Utilization 82.8%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service E

A91

# HCM Unsignalized Intersection Capacity Analysis

## 4: Interlachen Blvd & Brookside Ave

1/31/2013

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lanes	1>	0	0	<1	1	1
Volume (veh/h)	104	18	39	496	440	239
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	111	19	41	528	468	254
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					431	
pX, platoon unblocked						
vC, conflicting volume	1079	468	722			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1079	468	722			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	52	97	95			
cM capacity (veh/h)	230	595	880			

Direction, Lane #	WB 1	SE 1	NW 1	NW 2
Volume Total	130	569	468	254
Volume Left	111	41	0	0
Volume Right	19	0	0	254
cSH	253	880	1700	1700
Volume to Capacity	0.51	0.05	0.28	0.15
Queue Length 95th (ft)	67	4	0	0
Control Delay (s)	33.2	1.3	0.0	0.0
Lane LOS	D	A		
Approach Delay (s)	33.2	1.3	0.0	
Approach LOS	D			

Intersection Summary			
Average Delay		3.5	
Intersection Capacity Utilization		68.3%	ICU Level of Service C
Analysis Period (min)		15	

A92

# HCM Unsignalized Intersection Capacity Analysis

6: Brookside Ave & 49th St

1/31/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lanes	1>	0	1>	0	0	<1
Volume (veh/h)	4	2	262	15	1	118
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	14	2	312	18	1	140
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	464	321			330	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	464	321			330	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	556	720			1230	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	17	330	142
Volume Left	14	0	1
Volume Right	2	18	0
cSH	575	1700	1230
Volume to Capacity	0.03	0.19	0.00
Queue Length 95th (ft)	2	0	0
Control Delay (s)	11.5	0.0	0.1
Lane LOS	B		A
Approach Delay (s)	11.5	0.0	0.1
Approach LOS	B		

Intersection Summary			
Average Delay		0.4	
Intersection Capacity Utilization		24.7%	ICU Level of Service
Analysis Period (min)		15	A

A93

Lanes, Volumes, Timings  
7: Interlachen Blvd & Vernon Ave

1/31/2013

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	2>	0	0	<2>	0	1	1>	0	1	1>	0
Volume (vph)	230	727	22	65	397	332	28	93	6	328	129	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	125		0	0		0	60		0	275		0
Storage Lanes	1		0	0		0	1		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1770	3525	0	0	3303	0	1770	1846	0	1770	1786	0
Flt Permitted	0.950				0.797		0.578			0.690		
Satd. Flow (perm)	1770	3525	0	0	2643	0	1077	1846	0	1285	1786	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			189			3			19	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		498			675			490			431	
Travel Time (s)		11.3			15.3			11.1			9.8	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Shared Lane Traffic (%)												
Lane Group Flow (vph)	242	788	0	0	835	0	29	104	0	345	187	0
Turn Type	Prot	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	1	6			2			4			4	
Permitted Phases				2			4			4		
Total Split (s)	24.0	66.0		42.0	42.0		39.0	39.0		39.0	39.0	
Total Lost Time (s)	5.5	5.5			5.5		5.5	5.5		5.5	5.5	
Act Effct Green (s)	17.4	62.6			39.6		31.4	31.4		31.4	31.4	
Actuated g/C Ratio	0.17	0.60			0.38		0.30	0.30		0.30	0.30	
v/c Ratio	0.83	0.37			0.75		0.09	0.19		0.90	0.34	
Control Delay	65.3	12.0			27.5		26.2	26.6		62.1	27.0	
Queue Delay	0.0	0.0			0.0		0.0	0.0		0.0	0.0	
Total Delay	65.3	12.0			27.5		26.2	26.6		62.1	27.0	
LOS	E	B			C		C	C		E	C	
Approach Delay		24.5			27.5			26.5			49.8	
Approach LOS		C			C			C			D	
Queue Length 50th (ft)	157	142			210		14	49		215	85	
Queue Length 95th (ft)	#277	182			292		36	90		#375	144	
Internal Link Dist (ft)		418			595			410			351	
Turn Bay Length (ft)	125						60			275		
Base Capacity (vph)	311	2102			1115		343	591		409	582	
Starvation Cap Reductn	0	0			0		0	0		0	0	
Spillback Cap Reductn	0	0			0		0	0		0	0	
Storage Cap Reductn	0	0			0		0	0		0	0	
Reduced v/c Ratio	0.78	0.37			0.75		0.08	0.18		0.84	0.32	

Intersection Summary

Area Type: Other  
 Cycle Length: 105  
 Actuated Cycle Length: 105  
 Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBT, Start of Green  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 0.90  
 Intersection Signal Delay: 30.9  
 Intersection Capacity Utilization 82.9%  
 Analysis Period (min) 15  
 Intersection LOS: C  
 ICU Level of Service E

A94

# HCM Unsignalized Intersection Capacity Analysis

## 4: Interlachen Blvd & Brookside Ave

1/31/2013

Movement	WBL	WBR	SEL	SET	NWT	NWR
Lanes	1>	0	0	<1	1	1
Volume (veh/h)	105	18	39	496	440	240
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	112	19	41	528	468	255
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)					431	
pX, platoon unblocked						
vC, conflicting volume	1079	468	723			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1079	468	723			
IC, single (s)	6.4	6.2	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	52	97	95			
cM capacity (veh/h)	230	595	879			

Direction, Lane #	WB 1	SE 1	NW 1	NW 2
Volume Total	131	569	468	255
Volume Left	112	41	0	0
Volume Right	19	0	0	255
cSH	253	879	1700	1700
Volume to Capacity	0.52	0.05	0.28	0.15
Queue Length 95th (ft)	68	4	0	0
Control Delay (s)	33.5	1.3	0.0	0.0
Lane LOS	D	A		
Approach Delay (s)	33.5	1.3	0.0	
Approach LOS	D			

Intersection Summary				
Average Delay			3.6	
Intersection Capacity Utilization		68.3%	ICU Level of Service	C
Analysis Period (min)		15		

A95

# HCM Unsignalized Intersection Capacity Analysis

## 6: Brookside Ave & 49th St

1/31/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lanes	1>	0	1>	0	0	<1
Volume (veh/h)	5	2	262	16	1	118
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	18	2	312	19	1	140
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	464	321			331	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	464	321			331	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	556	719			1228	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	20	331	142
Volume Left	18	0	1
Volume Right	2	19	0
cSH	571	1700	1228
Volume to Capacity	0.04	0.19	0.00
Queue Length 95th (ft)	3	0	0
Control Delay (s)	11.5	0.0	0.1
Lane LOS	B		A
Approach Delay (s)	11.5	0.0	0.1
Approach LOS	B		

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization		24.8%	ICU Level of Service
Analysis Period (min)		15	A

A96

## Jackie Hoogenakker

---

**From:** Dan Kersten <dankersten@gmail.com>  
**Sent:** Saturday, March 02, 2013 2:08 PM  
**To:** Jackie Hoogenakker  
**Subject:** re: 2013.005, Edina Fifty Five, LLC

My wife Michelle and I live at 4817 Rutledge.

We support the proposed rezoning and redevelopment. Sounds like it will be good for the neighborhood.

646-717-4584 (cell)  
952-984-3107 (work)

## Jackie Hoogenakker

---

**From:** dede skold <dedskold@gmail.com>  
**Sent:** Thursday, March 07, 2013 12:51 PM  
**To:** Jackie Hoogenakker  
**Subject:** Comments for Planning Commission Rezoning

Dear Commissioners,

I am writing you concerning the proposed rezoning on W. 49th St. and Puckwana.  
I am the last original member of this neighborhood. I have lived in my home since 1952.  
I love my neighborhood and want to see it retain it's charm and character.

I find that the plans that were sent to us March 1st are totally unacceptable. The front to W.49th street looks like a fortress. There are no trees, grass or a site line through the property. ( We don't need a sidewalk along W. 49th but would greatly appreciate a walkway from 49th to Vernon.) We would lose two specimen maple trees and wonderful green space if this happens. The plan is far to dense to be welcoming. I think that the area could take on 12 units, max. I think that the present apartments could be reconfigured to have 1 and 2 story housing. Three story units could go along Puckwana and to the back of the lot along Vernon. The variety of elevations and landscaping would add interest and be welcoming to that space.

My second concern is the added traffic problem. We have seen an increase in both train and auto traffic at the only entrance/exit to our neighborhood. This will only get worse in the future.

Thank you for your time and the consideration that you will give this matter.

Sincerely,

Doris Skold  
5101 Millpond Place  
(922) 929-7163











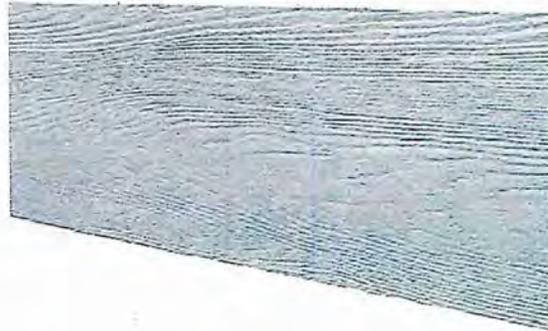
PAINTED FIBER CEMENT W/ BATTERNS



ARCHITECTURAL CAST STONE



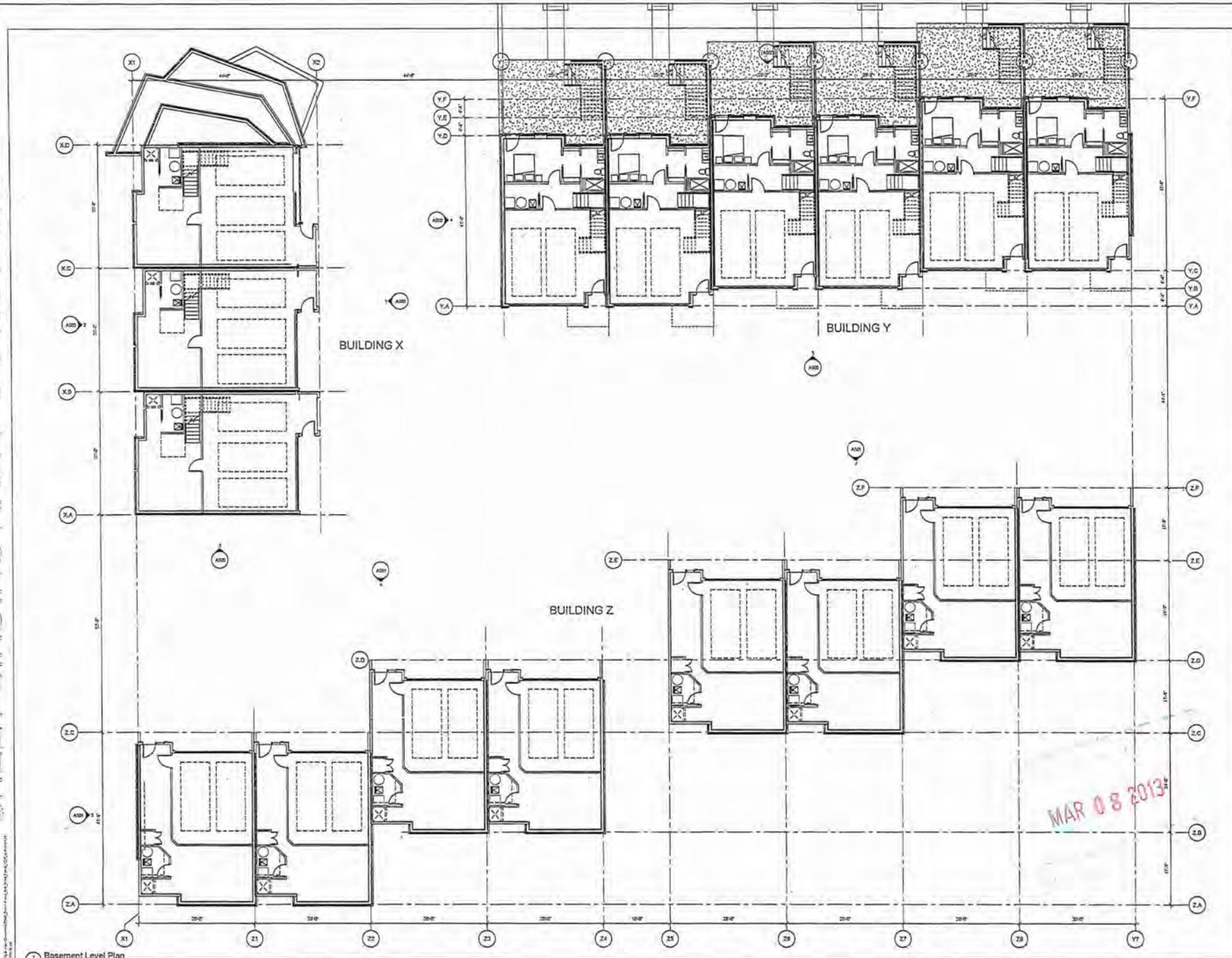
STAINED WOOD PANELS



FIBER CEMENT TRIM

PLANNING DEPARTMENT  
08.08.2013

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Facsimile: 612-339-6212  
www.bkvgroup.com  
CONSULTANTS

PROJECT TITLE

Vernon Avenue  
Townhouses

KEY PLAN NORTH ARROW

CERTIFICATION  
I hereby certify that this plan, specification  
or report was prepared by me or under my  
direct supervision and control and I am a duly  
Licensed Professional Engineer  
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DATE	12/08/12
DRAWN BY	mlr
CHECKED BY	clw
COMMISSIONING	12/14/12
SHEET TITLE	

REVISION	DATE

Basement Floor  
Plan

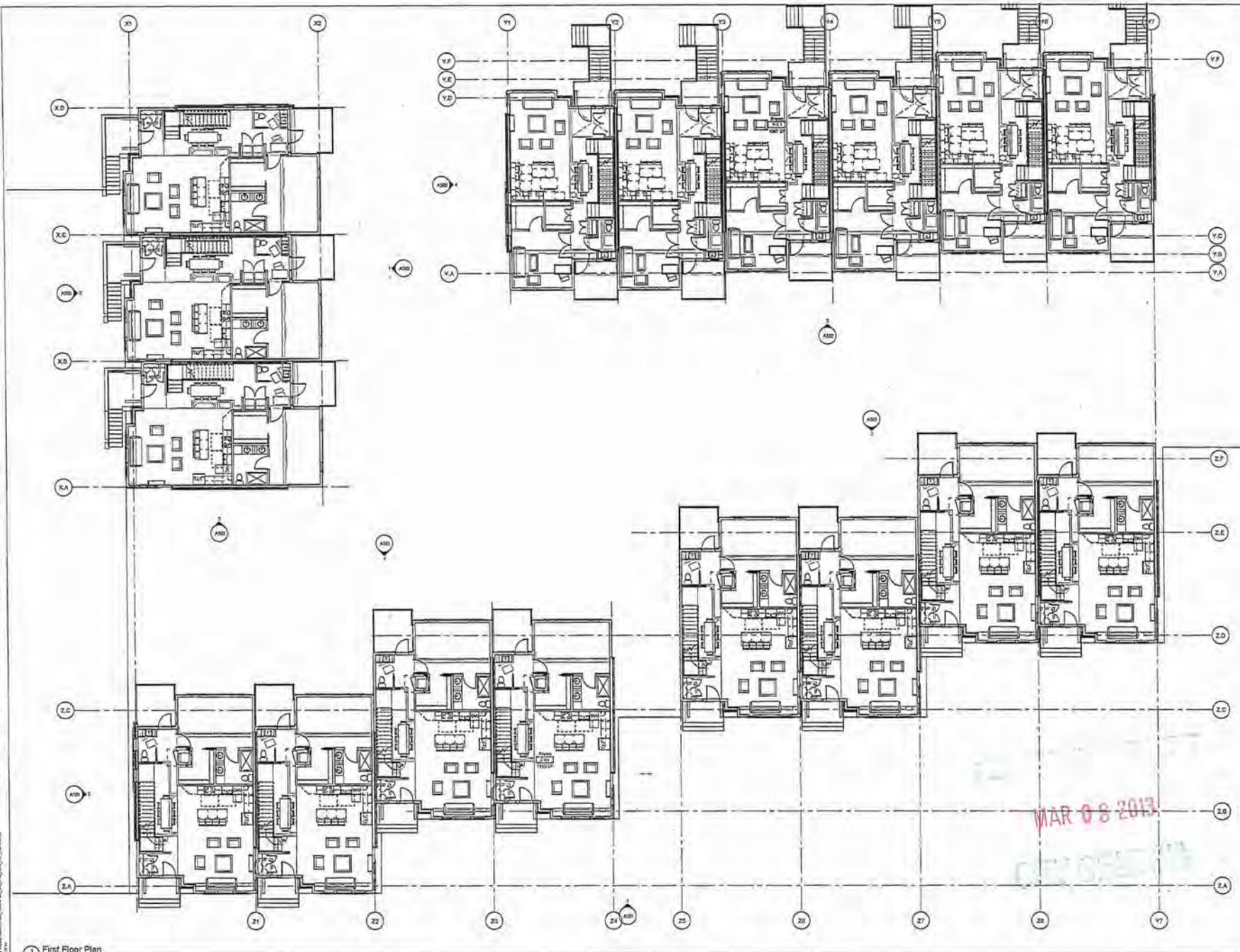
SHEET NUMBER

A100

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Basement Level Plan  
12/14/12

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1 First Floor Plan

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\_\_\_\_\_  
L.S.B.

License Number

REVISION DATE

DATE: 10/20/13  
DRAWN BY: J. Miller  
CHECKED BY: [Signature]  
COMMISSION NO.: 1074-01  
SHEET TITLE

MAR 08 2013

First Floor Plan

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A101

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210 Second Floor Plan  
1/8" = 1'-0"

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CREATED BY

COMMISSIONING

SHEET TITLE

Second Floor Plan

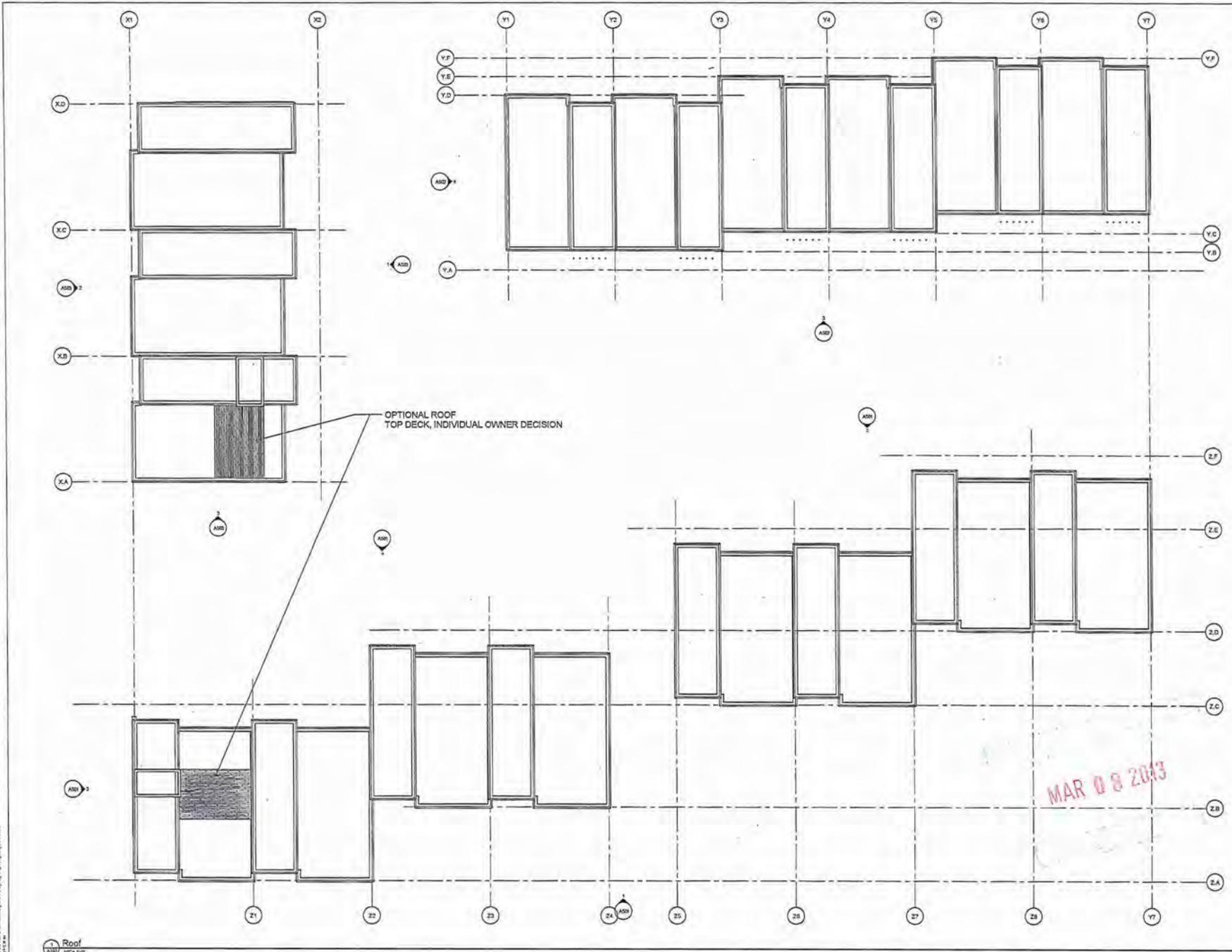
SHEET NUMBER

A102

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219 08 2013

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CHECKED BY

DATE

DATE

DRAWN BY

CHECKED BY

DATE

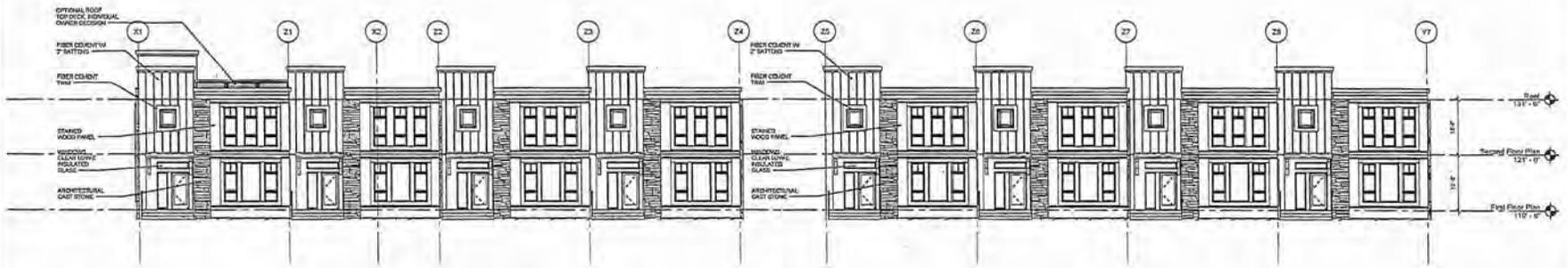
Roof Plan

SHEET NUMBER

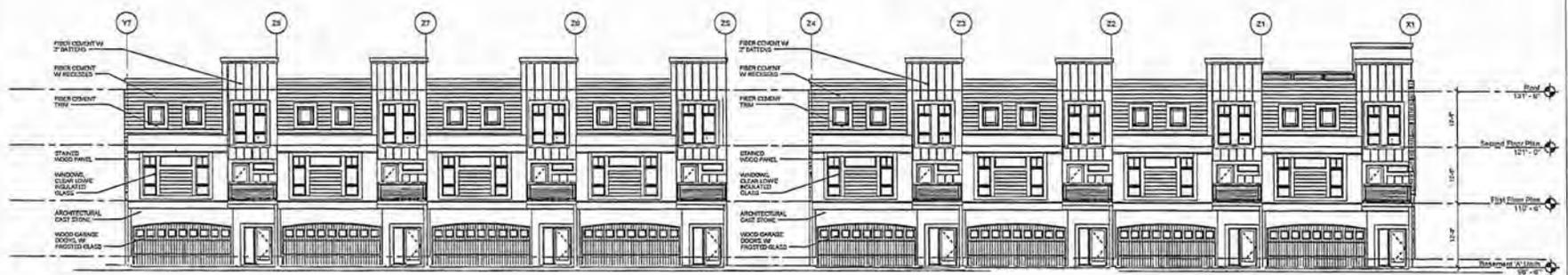
A103

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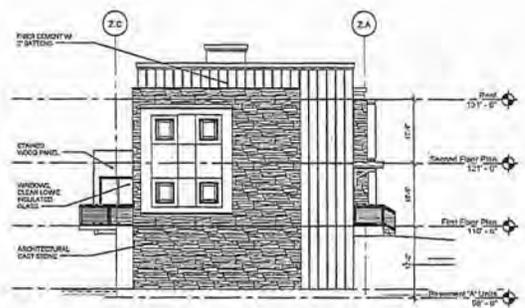
SHEET BINDING AREA - DO NOT USE



1 South Elevation - Building Z  
1/8" = 1'-0"



2 North Elevation - Courtyard Building Z  
1/8" = 1'-0"



3 West Elevation - Building Z  
1/8" = 1'-0"

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DATE	09-26-13
DRAWN BY	Austin
CHECKED BY	Chloe
COMMISSIONING	10/1/13
SHEET TITLE	

Exterior Elevations

SHEET NUMBER  
**A501**

MAR 08 2013

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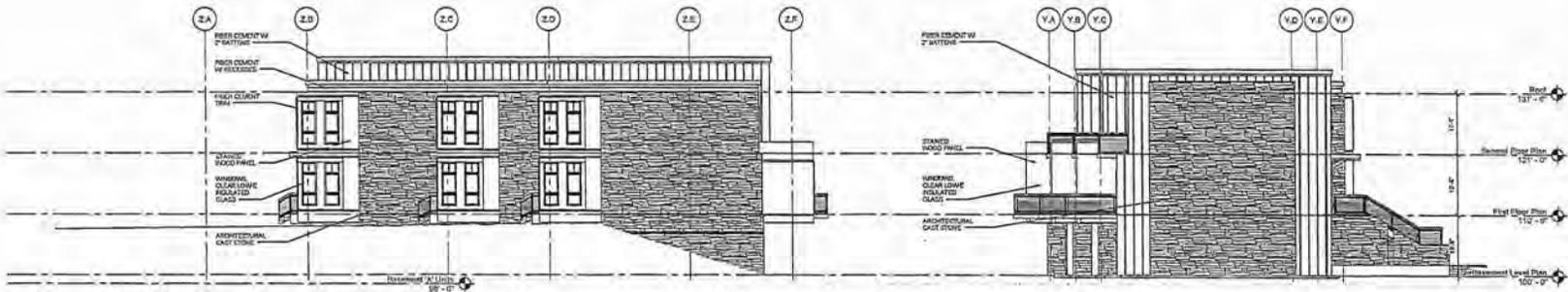
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North Elevation - Building X & Y  
10'-1 1/2"



East Elevation - Building Y & Z  
10'-1 1/2"



South Elevation - Courtyard Building Y  
10'-1 1/2"

West Elevation - Building Y  
10'-1 1/2"

PROJECT TITLE

Vernon Avenue  
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LOG  
LICENSING NUMBER  
REVISION DATE

DATE DRAWN BY  
CHECKED BY  
COMMISSIONING SHEET TITLE

Exterior Elevations

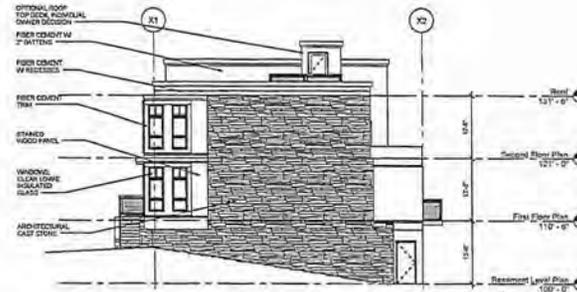
SHEET NUMBER  
A502

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SHEET BINDING AREA - DO NOT USE



1 East Elevation - Courtyard Building X  
1/8" = 1'-0"



2 South Elevation - Building X  
1/8" = 1'-0"



3 West Elevation - Building X  
1/8" = 1'-0"

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Licensed Professional  
under the laws of the State of Minnesota.

DATE

DESIGN NUMBER

REVISION	DATE

DATE	05/06/13
DRAWN BY	John
CHECKED BY	Chris
COMMISSION NO.	1414 01

SHEET TITLE

Exterior Elevations

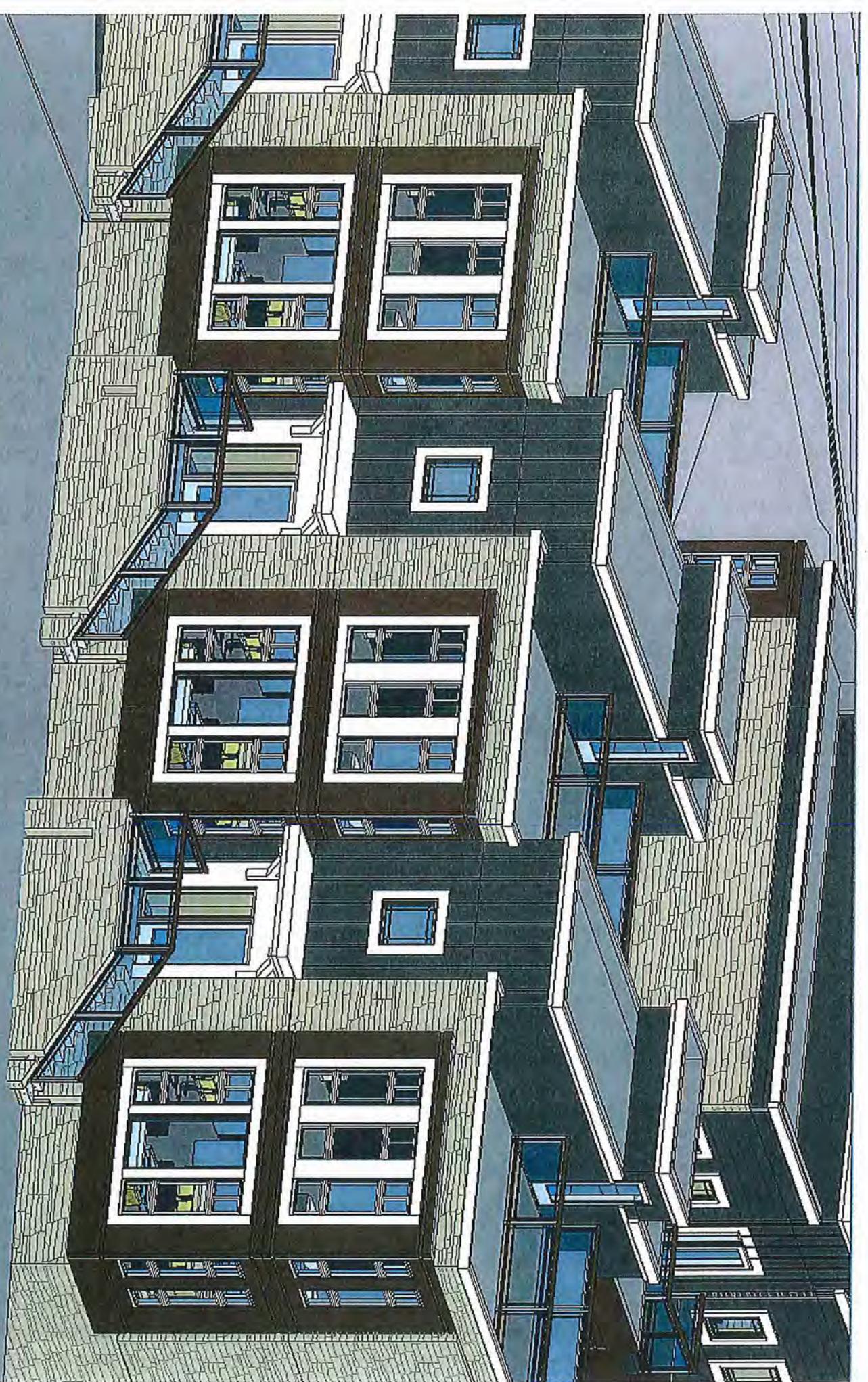
SHEET NUMBER

A503

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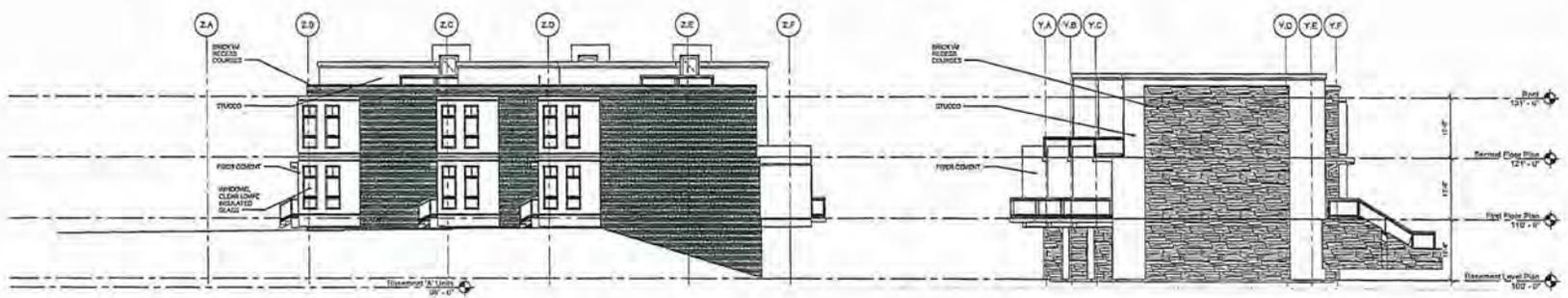




SHEET BINDING AREA - DO NOT USE



1 North Elevation - Building X & Y



2 East Elevation - Building Y & Z



3 South Elevation - Courtyard Building Y

4 West Elevation - Building Y

**BKV**  
GROUP

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Inc.**

222 North Second Street  
Minneapolis, MN 55401  
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Facsimile: 612-339-6212  
www.bkvgroup.com  
CONSULTANTS

PROJECT TITLE

Vernon Avenue  
Townhouses

KEY PLAN NORTH ARROW

CERTIFICATION  
I hereby certify that this plan, specification  
or report was prepared by me or under my  
direct supervision and that I am a duly  
Licensed Professional  
under the laws of the State of Minnesota.

DATE

DATE

REVISION	DATE

DATE	01/24/13
DRAWN BY	John
CHECKED BY	Chris
COMMISSIONED	08/11

Exterior Elevations

SHEET NUMBER

A502

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## Jackie Hoogenakker

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**From:** nancy hall <nlpHall@comcast.net>  
**Sent:** Tuesday, March 26, 2013 9:44 PM  
**To:** Jackie Hoogenakker  
**Subject:** FW:  
**Attachments:** 49th Street Project.pdf

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**From:** nancy hall [<mailto:nlpHall@comcast.net>]

**Sent:** Tuesday, March 26, 2013 6:22 PM

**To:** [alina.perez-campos@fallon.com](mailto:alina.perez-campos@fallon.com); Alex and Michael Landreville ([alexanderlandreville\\_2013@depauw.edu](mailto:alexanderlandreville_2013@depauw.edu)); ann legeros ([annlegeros@edina.k12.mn.us](mailto:annlegeros@edina.k12.mn.us)); [bkaroli@yahoo.com](mailto:bkaroli@yahoo.com); blake johnson; [Bigmama375@aol.com](mailto:Bigmama375@aol.com); brad case ([bdcase8@yahoo.com](mailto:bdcase8@yahoo.com)); Vicki Berg ([bergwolf@hotmail.com](mailto:bergwolf@hotmail.com)); Charles and Sue Kelly ([susanjkelly@comcast.net](mailto:susanjkelly@comcast.net)); [doug@waterdesigngroup.com](mailto:doug@waterdesigngroup.com); [elizabeth.macdonagh@gmail.com](mailto:elizabeth.macdonagh@gmail.com); Elizabeth King ([king.home@comcast.net](mailto:king.home@comcast.net)); [gretasim11@gmail.com](mailto:gretasim11@gmail.com); Gary Rooney ([MLRooney10@aol.com](mailto:MLRooney10@aol.com)); [ha.janet.222@gmail.com](mailto:ha.janet.222@gmail.com); John Purdum ([jpir750@gmail.com](mailto:jpir750@gmail.com)); [joyhazuca@gmail.com](mailto:joyhazuca@gmail.com); [jmkscott@msn.com](mailto:jmkscott@msn.com); Joel and Harmony Kaplan ([jkaplanslookout@comcast.net](mailto:jkaplanslookout@comcast.net)); Johnfolkestad ([johnfolkestad@salollc.com](mailto:johnfolkestad@salollc.com)); june kuntz ([jbk630@live.com](mailto:jbk630@live.com)); Julia Tangeman ([jjtangeman@aol.com](mailto:jjtangeman@aol.com)); [lagerstrom22@comcast.net](mailto:lagerstrom22@comcast.net); Kim Gharrity ([kcgharrity@gmail.com](mailto:kcgharrity@gmail.com)); marta martinez davison ([mcmdavison@mac.com](mailto:mcmdavison@mac.com)); [nhaley@mac.com](mailto:nhaley@mac.com); Nancy Peters ([nancy.peters@courts.state.mn.us](mailto:nancy.peters@courts.state.mn.us)); Olivia and Ricardo Gorostiaga ([o.gorostiaga@gmail.com](mailto:o.gorostiaga@gmail.com)); 'Penelope Purdum' ([penelope@waterdesigngroup.com](mailto:penelope@waterdesigngroup.com)); Randy Swanstrom ([randy.swanstrom@fcgm.com](mailto:randy.swanstrom@fcgm.com)); [shannon.case@yahoo.com](mailto:shannon.case@yahoo.com); [smithkaralyn@gmail.com](mailto:smithkaralyn@gmail.com); [sara\\_strothman@uhc.com](mailto:sara_strothman@uhc.com); 'Suzanne Kerwin'; [sfolkestad@comcast.net](mailto:sfolkestad@comcast.net); Tracey Zavadil ([shinybirdy@yahoo.com](mailto:shinybirdy@yahoo.com)); [shardy73@gmail.com](mailto:shardy73@gmail.com); [susengen@edina.k12.mn.us](mailto:susengen@edina.k12.mn.us); 'Jennifer Livingston'; [thequinbys@q.com](mailto:thequinbys@q.com); Katie and Tim Meehan ([Tsmeeh@aol.com](mailto:Tsmeeh@aol.com)); [keazar@comcast.net](mailto:keazar@comcast.net); kathy w. clifford; [kfgroomes@gmail.com](mailto:kfgroomes@gmail.com); [KristinSmith@edinarealty.com](mailto:KristinSmith@edinarealty.com); 'jhoogenakker@edinagov.mn'; 'k.carter@comcast.net'; Ann Swenson ([swensonann1@gmail.com](mailto:swensonann1@gmail.com)); [jhovland@krausehovland.com](mailto:jhovland@krausehovland.com); joni bennett ([jonibennett12@comcast.net](mailto:jonibennett12@comcast.net)); Josh Sprague ([joshsprague@edinarealty.com](mailto:joshsprague@edinarealty.com)); Mary Brindle ([mbrindle@comcast.net](mailto:mbrindle@comcast.net))

**Subject:**

Good Afternoon,

I am sending this proposal out to our neighborhood and the Edina City Council. I do not approve of this proposed rezoning.

This is the layout of the proposed rezoning on 49<sup>th</sup> and Brookside. This is really going to impact our neighborhood with traffic. The design is not in keeping with the neighborhood.

This is an unnecessary change to the comprehensive plan and our zoning code. There is no hardship proven and no need for this rezoning. The due diligence hasn't been done by our planning commission.

The traffic study was flawed at best saying that there will be no additional impact on the neighborhood with 17 additional homes, guests, etc. as it is nearly impossible to get on Interlachen from Brookside most mornings and evenings. This will definitely increase traffic on Rutledge, Hollywood, Vandervork, Division and Cooper.

If you know anyone in this area that I have missed, please forward this to them.

This will be happening on April 2<sup>nd</sup> at the city hall. I suggest that if you value your property you may wish to attend and please send a note to [jhoogenakker@edinagov.mn](mailto:jhoogenakker@edinagov.mn) as recommended on the page attached.

Regards,

Nancy Purdum-Hall  
4501 Parkside Lane  
Edina, MN 55436

City of Edina Planning Department

Case file: 20013.005 Hunt Associates

Property Address 5109-5125 49<sup>th</sup> Street West, Edina MN

Good Morning,

The purpose of this letter is to express our views on rezoning and planned development coming before the Council April 2, 2013. I will be attending the meeting. As a 35 year resident of the neighborhood and with 49<sup>th</sup> Street as our single access in/out of the neighborhood we have a vested interest in changes to zoning and final building plans.

Having attended a significant number of planning meetings on this project I believe the applicant has made progress in revising their intent and development designs for the land use. We want to see development on this parcel.

We are asking you for further modifications to make the project even better for the existing neighborhood and future residents.

Keep in mind we are a neighborhood. **I encourage you to visit 49<sup>th</sup> Street to understand the impact of decisions before you.**

**Density:** Our concern is for density on 49<sup>th</sup> Street. The number and height of the units are not in balance with the established neighborhood. A modification to reduce from 6 units to 4 units along 49th would allow for more "breathing room", green space, and lessen the tunnel and wall effect to the neighborhood. Two fewer units might also allow the 49<sup>th</sup> street homes to be one story resulting in home sites more attractive to residents requiring single story living. One story would also be more in keeping with neighbor home styles (ramblers) on 49<sup>th</sup> Street and throughout the neighborhood.

**Parking:** Please consider where visitors, service, and emergency vehicles would park. Parking on 49<sup>th</sup> is very limited; 4-5 cars at best. How would pull off parking inside the development, as on Vernon Lane, work to improve the plan? In all seasons navigating is a challenge with cars parked on 49<sup>th</sup> street.

I did not see a turnaround for the development private road; how would service trucks (garbage, parking, utility) maneuver in the space?

I expect current **construction** discussions would be in play with this project. We would expect everything possible to be done to minimize impact to the neighborhood with drainage, roads, construction parking, deliveries and utilities. Your reassurances are important to us.

Finally, we are the 99%ers in Edina. We saw the benefits of Grandview long before it had a name. We ask you to hold developers accountable for projects that are **Right Sized for our neighborhood.**

Mary and Bill Hartupee

5016 Edinbrook Lane

Edina, MN 55436 [maltuvilla@earthlink.net](mailto:maltuvilla@earthlink.net) 952-926-1487

## Jackie Hoogenakker

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**From:** Kevin Kuemmel <kevin.kuemmel@WDPI.com>  
**Sent:** Tuesday, March 12, 2013 6:57 PM  
**To:** Jackie Hoogenakker

Hi Jackie,

I'm a resident at 5008 edinbrook lane and I'm extremely concerned about the new development proposal. It is a lot of housing crammed into a space and my biggest two issues is the parking [corner on 49th is very tight and unsafe the way it is] and the traffic from 17 houses and only 1 exit for all of the houses. I'd be much more inclined to be a proponent of this with off street parking and another entrance [2 options]. I am or redeveloping those less appealing houses but this many people given the parking restraints and exits seems like a bad idea for me. I am unable to attend the meeting tomorrw but if there is anything I can do or ay questions you may have, please let me know.

Kevin kuemmel  
5008 edinbrook lane  
651 270 5645

Sent from my Samsung Epic™ 4G

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