

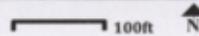
494 Spruce Street
Morgantown, WV 26505

PEDESTRIAN WIND FLOW ANALYSIS REPORT

Submitted to: The City of Morgantown Planning and Zoning
389 Spruce Street
Morgantown, WV 26505



Figure 1 Site Location (source: google map)



Consultant: ISOENV Environmental Design Lab
2200 Benjamin Franklin Pkwy
Philadelphia, PA 19130



Jihun Kim, Principal Investigator
Registered Architect of Pennsylvania [RA405933]

SUMMARY

The objective of current research is to predict the change in wind condition at the pedestrian level. Computational wind tunnel analysis was conducted to understand impact of the proposed building on wind condition at its neighborhood. Only the immediate surrounding buildings are geometrically modeled because they have the most significant impact on wind flow. The purpose of the analysis is for the city of Morgantown to estimate the microclimate change caused by new construction compared to the existing condition.

Computational wind tunnel analysis has been validated and widely accepted in wind engineering and urban scale environmental analysis, replacing physical wind tunnel test that costs much more resources and time along with its own uncertainties, such as translation issue to real-life size from scale model in the test. The consultant used one of the most advanced wind simulation in the industry for high prediction accuracy: ANSYS Fluent v14. Please note that there will be a simplification process, as the general wind engineering approach, by selectively including geometries that are significant to wind speed and pattern in urban scale. For example, buildings are considered but street lights are not.

The climate data in use is 'Typical Meteorological Year' (TMY), which is available from the National Oceanic and Atmospheric Administration (www.noaa.gov). We use this data type because it is synthesized with 30 year period weather so that it would better represent the longevity of buildings. It is also generally acceptable in wind engineering and urban climate analysis. 'Morgantown Municipal Airport' is chosen, given it is the nearest available TMY data that is only 2.5 miles away from the site of interest.

As results, our statistical analyses with the simulation outcome showed the minor impact on pedestrian wind condition. Average 0.96% of wind velocity is reduced at +2m above ground of the entire neighborhood, as it is shown at Table 1. It is because larger foot print of the building allowed less wind on the narrower street so that more wind was pushed to the atmosphere, when comparing Figure 3 to Figure 4. Another reason is 'wind shade effect', which reduced overall wind speed behind the proposed building that is taller than the existing, comparing Figure 5 to 6. We came to conclude that the proposed building may reduce pedestrian wind speed with minor degree based on our prediction result.

Table 1 Wind speed analysis at pedestrian level

	maximum	minimum	average	median
proposed	5.39	0.00	1.29	0.98
existing	4.62	0.00	1.32	1.05

REGIONAL WIND ANALYSIS

Annual wind condition of Morgantown is graphically represented at Figure 2, which shows more than 35 % of time wind comes from southwest with average speed of 4.5 m/s. Therefore, with this high frequency, this condition constitutes prevailing wind, which will be used as the input values for wind flow analysis.

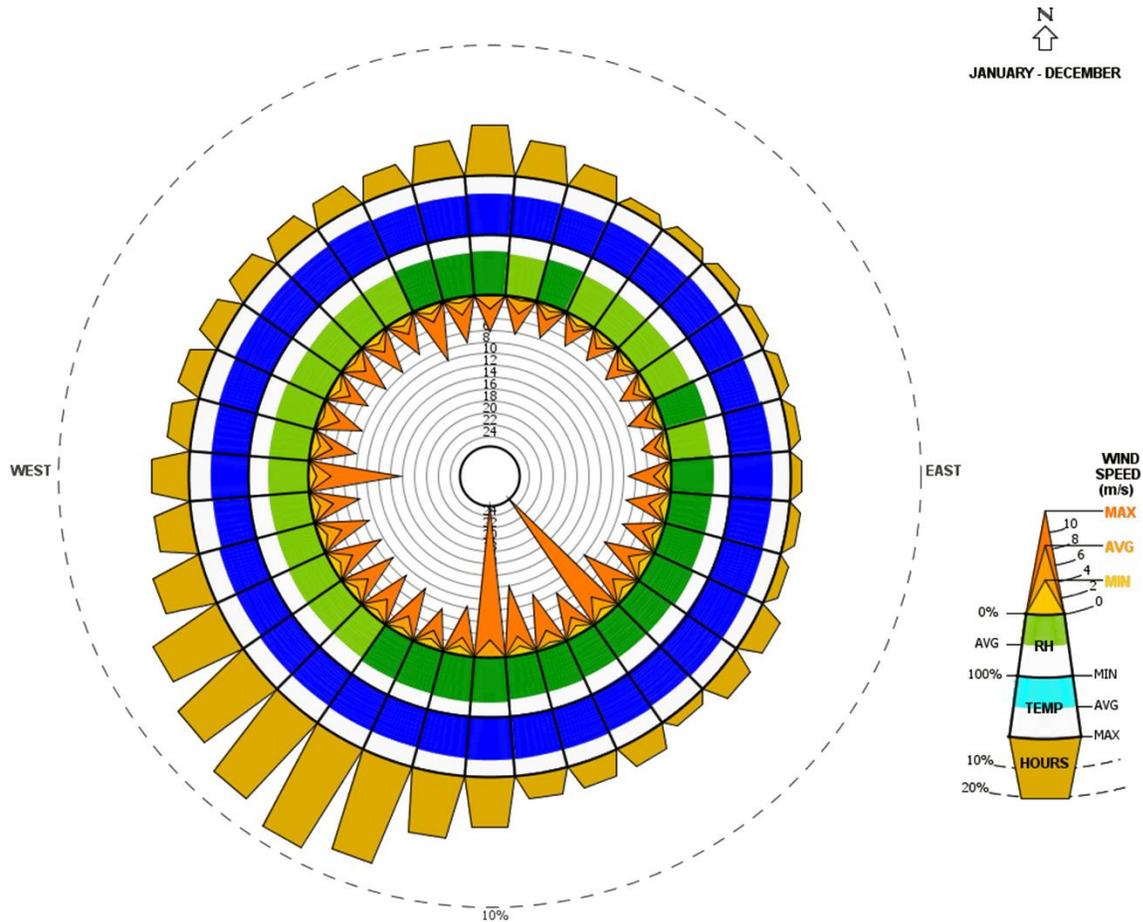


Figure 2 Annual Wind Rose

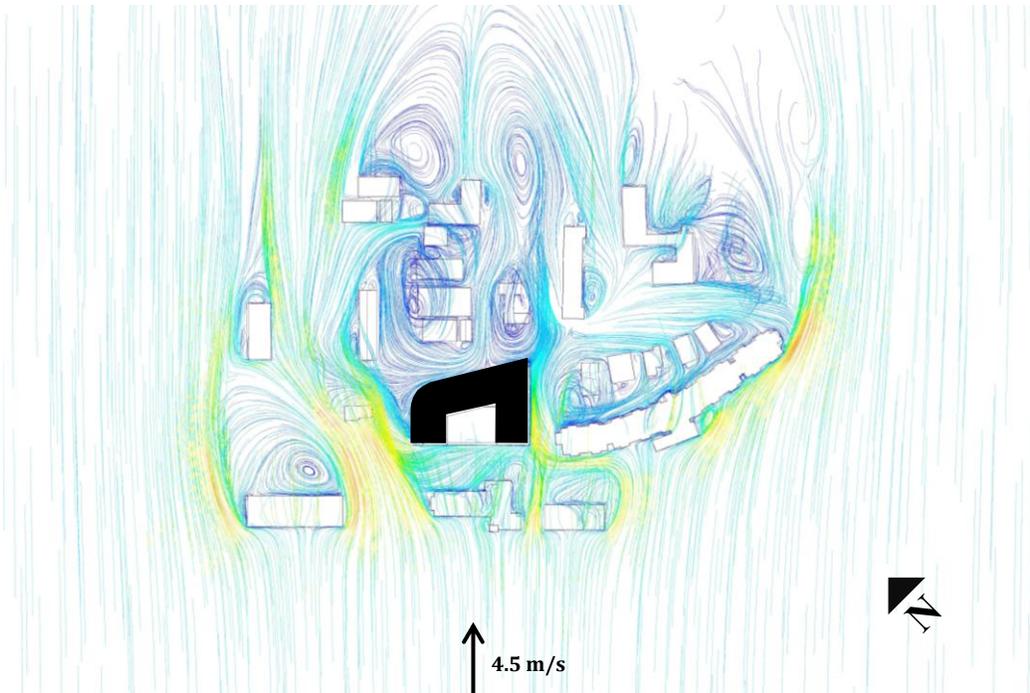


Figure 3 Proposed Building in Dark Shade - Wind Path lines at Pedestrian Level at +2m *

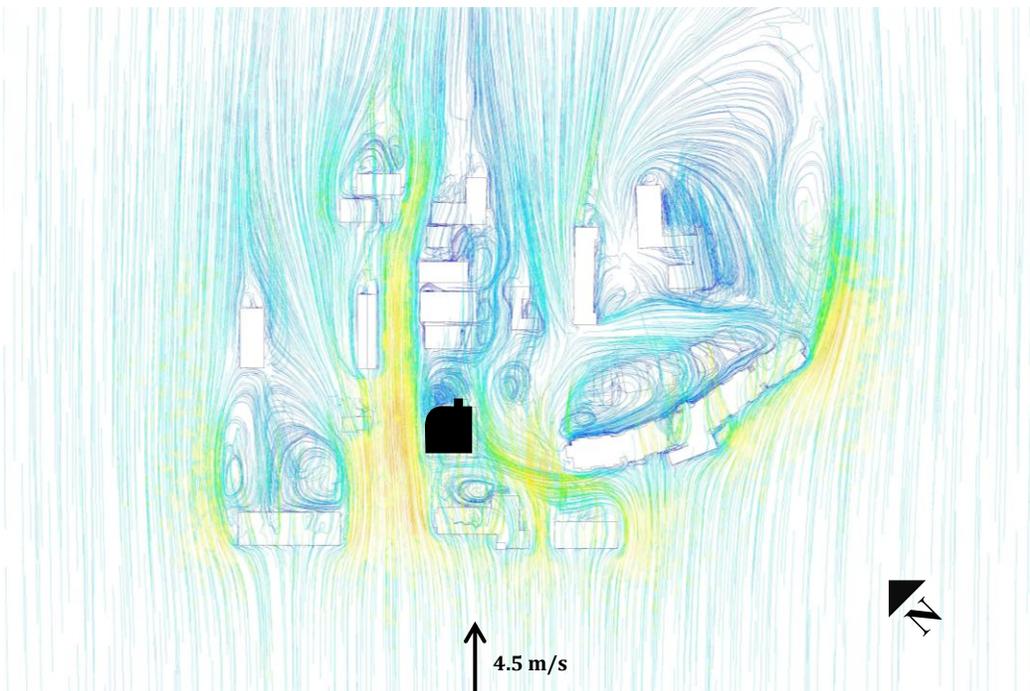


Figure 4 Existing Building in Dark Shade - Wind Path lines at Pedestrian Level at +2m *



* Color represents wind velocity and path lines represent the track of wind flow.

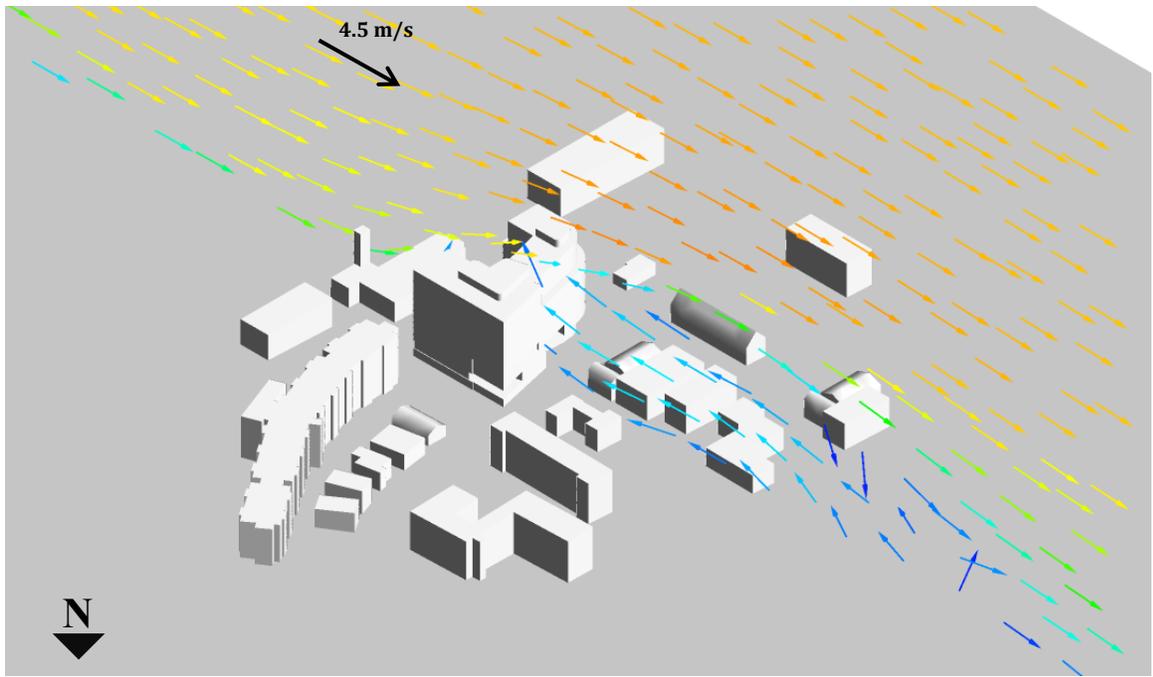


Figure 5 Proposed - Vector on Vertical Plane **

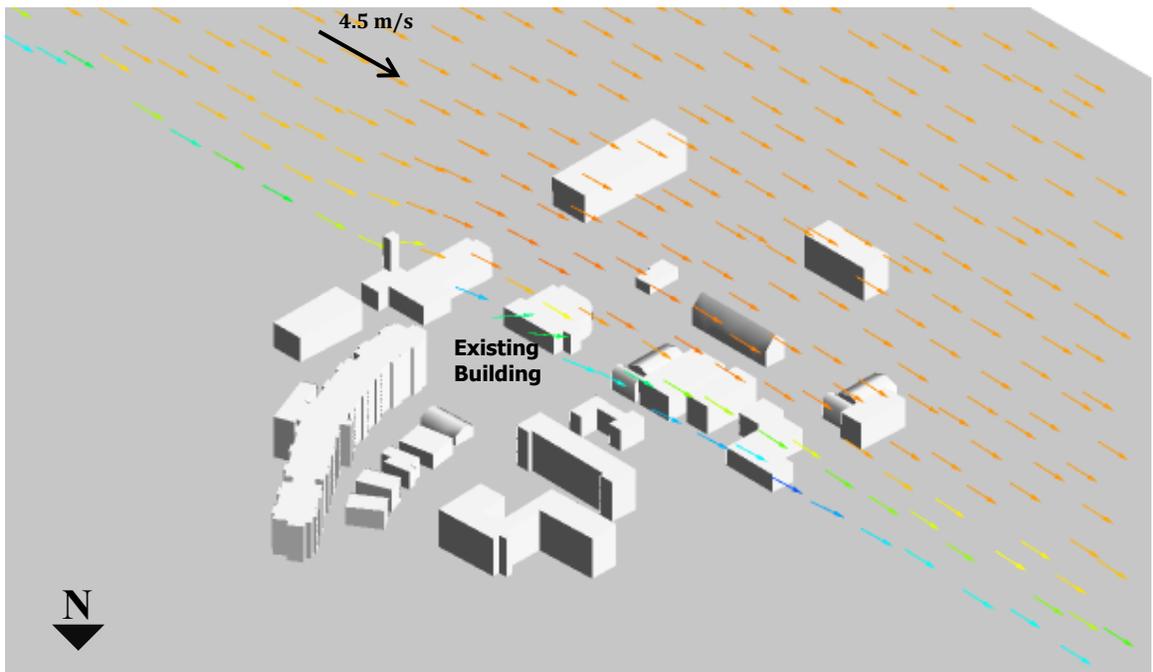
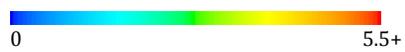


Figure 6 Existing - Vector on Vertical Plane **



** Arrow represents direction and color represents velocity

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WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

1900 Kanawha Boulevard East • Building Five • Room 110
Charleston, West Virginia 25305-0430 • (304) 558-3505

Earl Ray Tomblin
Governor

Paul A. Mattox, Jr., P. E.
Secretary of Transportation/
Commissioner of Highways

August 8, 2014

Mr. Dan Hrankowsky
Director of Design
CA Student Living
161 N Clark
Suite 2050
Chicago, Illinois 60601

Dear Mr. Hrankowsky:

In June 2014, the West Virginia Division of Highways (WVDOH) issued approval of a Traffic Impact Study (TIS) regarding the proposed 494 Spruce Development to be located adjacent to US 119 in Morgantown, Monongalia County. You recently notified the WVDOH that certain revisions to the scope of the project are proposed, and the WVDOH has reviewed the revised information presented to us.

The results of our review indicate that based on the information provided, the WVDOH sees no need for you to provide the WVDOH with any updates to the previously approved TIS, as the revisions are relatively negligible and no increase in trip generation is proposed. The previously approved TIS still would be in effect for WVDOH permitting purposes with no revisions necessary and the TIS would be finalized after you have addressed appropriately any comments/concerns you may receive from the City of Morgantown and/or the Greater Morgantown Metropolitan Planning Organization. As noted previously, you would need to provide the WVDOH with three printed versions and two electronic versions of the full, final, approved TIS.

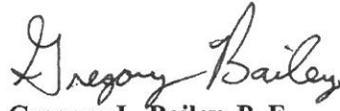
The access location along US 119 (Willey Street) appears to be the same as previously proposed and the WVDOH still is agreeable to that location, provided it has the same restriction (no left turn onto Willey Street from the site) as previously agreed. The information provided to the WVDOH also appears to indicate that the US 119 Northbound (Spruce Street) access now is proposed to be egress only from the site; the WVDOH has no objection to that but we are also still agreeable to a right-in/right-out access at Spruce Street as previously proposed. Also, please provide additional information concerning your proposed Option 1. Our understanding previously was that the bottom level of parking within the site was to be accessible only from Spruce Street. If the Spruce Street access is to be egress only, will the lower level of parking remain and if so, will it now be accessible from Willey Street?

Mr. Dan Hrankowsky
August 8, 2014
Page Two

The recommendations and conclusions of the TIS, once finalized, are to be incorporated into the Plans. When desired, you may submit to the WVDOH four sets of the Project Plans and any associated drainage calculations for review by WVDOH as part of our Plan approval/permitting process.

Thank you for your assistance with this matter. Should you require additional information, please contact Mr. David E. Cramer, P. E., of our Commissioner's Office of Economic Development, at (304) 558-9211.

Very truly yours,



Gregory L. Bailey, P. E.
State Highway Engineer

GLB:Cb

cc: Mr. Damien Davis, City of Morgantown
Mr. Chris Fletcher, City of Morgantown



Excellence Delivered **As Promised**

August 7, 2014

Mr. Dan Hrankowsky
Director of Design
CA Student Living
161 N Clark Street, Suite 2050
Chicago, IL 60601

**Re: Proposed 494 Spruce
Residential/Commercial Development**

Dear Mr. Hrankowsky:

Gannett Fleming, Inc. recently completed a Traffic Impact Study for the above-captioned project dated May 28, 2014. At the time, the report addressed a mixed-use development containing 368 bedrooms and 3,500 square feet of commercial space. Since that time, the development proposal has been modified to include 331 bedroom with the same amount of commercial space.

As indicated in the study, the anticipated trip generation for the residential portion of the development was based on research conducted at similar facilities. This research included the development of rates based on the number of apartment units, number of bedrooms, and number of parking spaces. The rates utilizing the number of bedrooms as the independent variable yielded the most conservative results and were therefore utilized for the analysis. This trip generation methodology was accepted by the West Virginia Division of Highways.

Considering the proposed change in residential intensity, the following tables outline a comparison of the anticipated trip generation for the original proposal versus the revised proposal.

Original Trip Generation Estimates

Land Use	AM Peak Hour			PM Peak Hour			Daily		
	In	Out	Total	In	Out	Total	In	Out	Total
368 Bedrooms	11	15	26	25	23	48	261	262	523
3,500 SF Retail	12	12	24	10	8	18	78	77	155
Total	23	27	50	35	31	66	339	339	678

Gannett Fleming

Proposed 494 Spruce

Residential/Commercial Development

Page 2 of 2

Revised Trip Generation Estimates

Land Use	AM Peak Hour			PM Peak Hour			Daily		
	In	Out	Total	In	Out	Total	In	Out	Total
331 Bedrooms	10	13	23	23	20	43	235	235	470
3,500 SF Retail	12	12	24	10	8	18	78	77	155
Total	22	25	47	33	28	61	313	312	625

As can be seen by comparing the tables, there is an 11 to 13 percent reduction in the number of trips for the residential portion of the development based on the revised development proposal.

The Traffic Impact Study summarized that the proposed development would have a minor impact on the adjacent roadway system, and as such no roadway, traffic signal, or other system improvements were recommended. It is our determination based on the above information that the revised proposal will have less of an impact to the adjacent roadway system as compared to the original proposal, and therefore the study outcome has not changed.

If you have any questions regarding this information, please do not hesitate to contact me.

Very truly yours,

Gannett Fleming, Inc.



Mark Metil, P.E., PTOE

Director of Transportation Operations and Planning



WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

Division of Highways

**1900 Kanawha Boulevard East • Building Five • Room 110
Charleston, West Virginia 25305-0430 • (304) 558-3505**

**Earl Ray Tomblin
Governor**

**Paul A. Mattox, Jr., P. E.
Secretary of Transportation/
Commissioner of Highways**

June 6, 2014

**Mr. Stephen G. Bus
Senior Vice President –
Acquisitions & Development
CA Student Living - CA Ventures
161 N Clark
Suite 2050
Chicago, Illinois 60601**

Dear Mr. Bus:

The West Virginia Division of Highways (WVDOH) has completed its review of the Traffic Impact Study (TIS) received electronically on May 28, 2014, regarding the proposed 494 Spruce Development to be located adjacent to US 119 in Morgantown (City), Monongalia County.

The results of our review indicate that the TIS can be approved by the WVDOH as submitted, although we stipulate that the TIS should be finalized only after you have addressed appropriately any comments/concerns you may receive from the City and/or the MPO. If the TIS is revised in any manner to reflect additional comments from other, then provide the WVDOH with three printed versions and two electronic versions of the full, final, approved TIS. The recommendations and conclusions of the TIS, once finalized, are to be incorporated into the plans. When desired, you may submit to the WVDOH four sets of the project plans and any associated drainage calculations.

Thank you for your assistance with this matter. Should you require additional information, please contact Mr. David E. Cramer, P. E., of our Commissioner's Office of Economic Development, at (304) 558-9211.

Very truly yours,

**Original Signed By:
GREGORY L. BAILEY**

**Gregory L. Bailey, P. E.
Acting State Highway Engineer**

GLB:Cm

**cc: Ms. Terry Hough
City of Morgantown**

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Memo

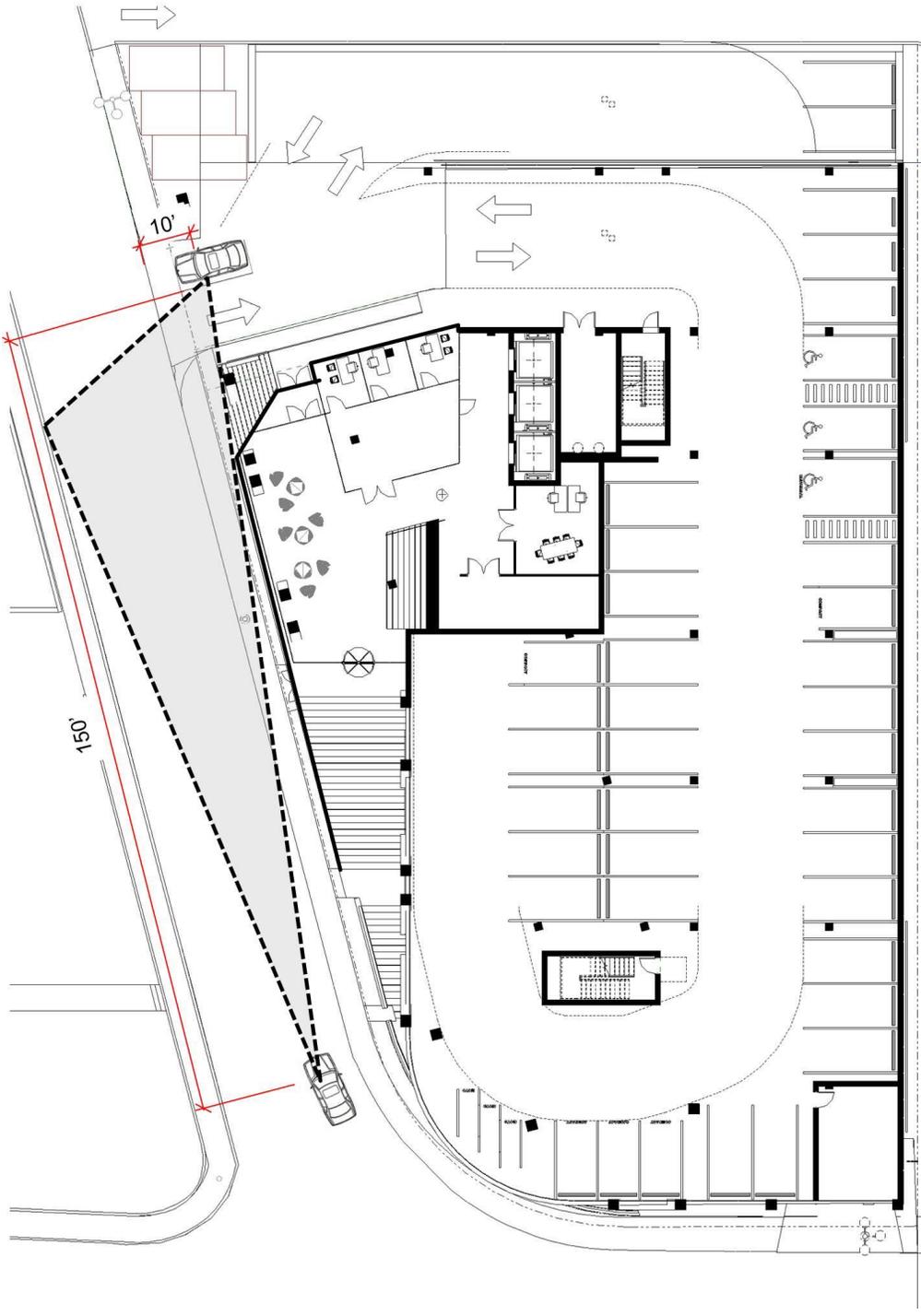
City of Morgantown Department of Public Works and Engineering

To: Chris Fletcher, Director of Development Services
From: Terry Hough, Director
Subject: 494 Spruce Street Traffic Impact Study/Sight Distance.
Date: June 10, 2014

The final Traffic Impact Study (TIS) was submitted to this office regarding the proposed development located at 494 Spruce Street. After reviewing the study, along with discussions with the West Virginia Division of Highways, it is the conclusion of this office that the proposed increase in the vehicular volumes due to this development will have a minor impact on the Level of Service (LOS) of the adjoining roadway system. Given this, there are no roadway system improvements recommended.

This office did have concerns regarding the sight distance for vehicles exiting the development onto Willey Street. A subsequent plan has been submitted showing changes to the site development which eliminates the sight distance concerns. The submitted plans are included with this memo.

Given the above, this office approves the submitted TIS for this project. If you have any questions or need any additional information, please do not hesitate to contact me.



Corner Visibility

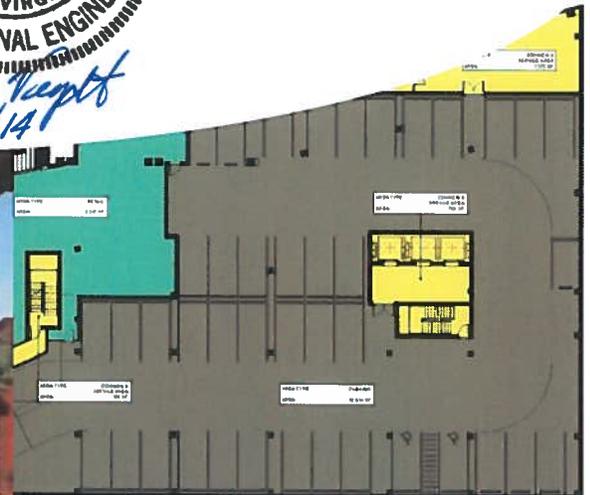
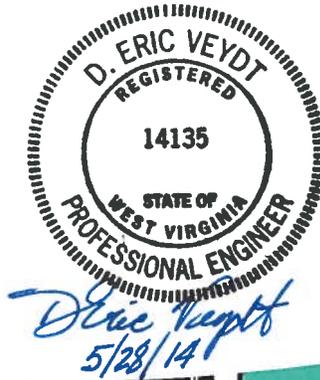
Traffic Impact Study Proposed Mixed-Use Residential Commercial Development at 494 Spruce Street

City of Morgantown, West Virginia

Prepared for: **Campus Acquisitions Holdings, LLC**
CA Student Living, LLC
Chicago, IL



Prepared by:  **Gannett Fleming**
D. Eric Veydt, P.E.
Mark Metil, P.E., PTOE



May 28, 2014

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1.0 EXECUTIVE SUMMARY

Gannett Fleming has completed a Traffic Impact Study (TIS) for the proposed 494 Spruce residential/commercial development to be located in Morgantown, WV. This study was performed in accordance with West Virginia Division of Highways (DOH) Traffic Engineering Directive (TED) 106-2.

The purpose of the study was to determine if the 494 Spruce residential/commercial development would adversely affect the surrounding roadway network. Study findings included the following:

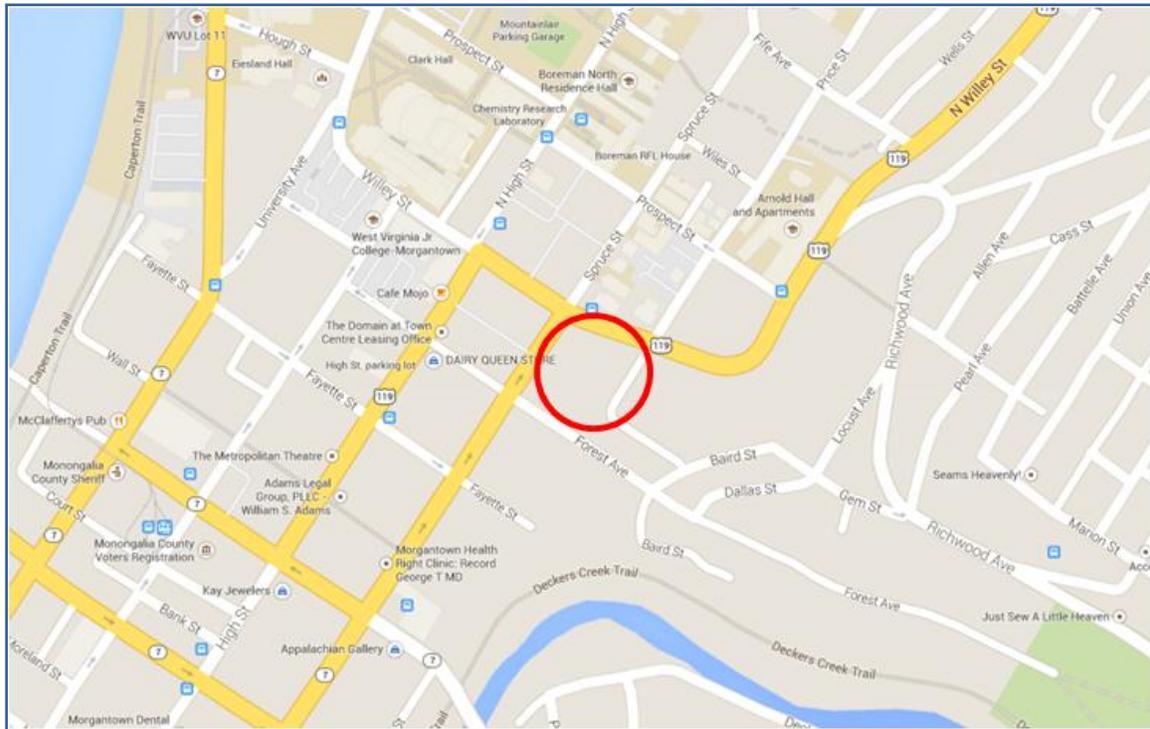
- The study area included the following intersections:
 - Willey Street and High Street (US Route 119 Southbound)
 - Willey Street and Spruce Street (US Route 119 Northbound)
 - Willey Street and Price Street
 - Willey Street and Proposed Access Driveway
 - Spruce Street and Proposed Access Driveway.
- The proposed development is projected to generate 50 total trips during the AM Peak Hour, 66 total trips during the PM Peak Hour, and 678 total daily trips.
- The addition of site generated traffic from the proposed development results in only a 2-3% increase in traffic volume at the study intersections.
- The results of the operational analysis indicate that there will be no degradation of LOS as a result of anticipated traffic from the 494 Spruce development compared to the no-build condition.
- The results of the queue analysis indicate that the addition of site generated traffic from the proposed development will not result in exceeding the available storage length for intersection movements with adequate storage capacity.

Considering the findings of the study as summarized above and detailed in the body of this report, the proposed development will have a minor impact on the adjacent roadway system, and as such no roadway, traffic signal, or other system improvements are recommended.

2.0 GENERAL OVERVIEW OF THE DEVELOPMENT

The proposed 494 Spruce development will be located on a parcel of land on the south side of Willey Street between Spruce Street (US Route 119 Northbound) and Price Street (Figure 1).

Figure 1. Site Location Map



The development will consist of 92 apartment units and approximately 3,500 SF of retail/commercial space. A three-level parking garage is also proposed that will accommodate approximately 126 parking spaces and provide access to Willey Street and Spruce Street. The anticipated opening year for the development is 2016.

3.0 EXISTING ROADWAY CONDITIONS

3.1 Study Area

Based on discussions with representatives from the West Virginia Division of Highways and the City of Morgantown, the following intersections were identified for analysis:

- Willey Street and High Street (US Route 119 Southbound)
- Willey Street and Spruce Street (US Route 119 Northbound)
- Willey Street and Price Street.

3.2 Existing Roadway Conditions

A field reconnaissance was conducted of the study area to inventory existing roadway widths, number of lanes, posted speed limits, and traffic control. Photos of each study intersection are included in Appendix A, and applicable traffic signal plans are contained in Appendix B. The following provides a description of each intersection.

3.2.1 Intersection of Willey Street and High Street (US Route 119 Southbound)

The intersection of Willey Street with High Street (US Route 119 Southbound) is a four-leg intersection controlled by a traffic signal. The traffic signal provides four phases including a protected/permitted left-turn phase for Willey Street westbound and an exclusive pedestrian phase. High Street is one-way southbound while Willey Street accommodates traffic in both directions. The High Street southbound approach provides two lanes consisting of an exclusive right-turn lane and a combination left-turn/thru lane. Willey Street eastbound provides one lane to accommodate left-turns and thru movements. Willey Street westbound provides two lanes consisting of an exclusive left-turn lane and a thru lane. There were no posted speed limits observed in the vicinity of the intersection.

3.2.2 Intersection of Willey Street and Spruce Street (US Route 119 Northbound)

The intersection of Willey Street and Spruce Street (US Route 119 Northbound) is a four-leg intersection controlled by a traffic signal. The traffic signal provides three phases including an exclusive pedestrian phase. Spruce Street is one-way northbound while Willey Street accommodates traffic in both directions. The Spruce Street northbound approach provides three lanes consisting of exclusive left, thru, and right-turn lanes. One lane is provided on the Willey Street approaches. There were no posted speed limits observed in the vicinity of the intersection.

3.2.3 Intersection of Willey Street and Price Street

The intersection of Willey Street and Price Street is a three-leg intersection controlled by a STOP sign on the Price Street approach. There is also currently a driveway located immediately opposite Price Street. Each approach to the intersection provides one lane to accommodate all movements. There were no posted speed limits observed in the vicinity of the intersection.

4.0 EXISTING TRAFFIC VOLUMES

The data collection effort for the study consisted of intersection turning movement counts (TMCs) conducted within the identified study area.

4.1 Intersection Turning Movement Counts (TMCs)

Turning Movement Counts (TMCs) were conducted from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM on Friday, March 21, 2014, at each of the study intersections. Table 1 summarizes the total peak hour intersection volumes for each location, and Figure 2 illustrates the peak hour intersection turning movement volumes. The raw traffic data collected at each intersection is included in Appendix C.

Table 1. Total Peak Hour Intersection Volumes

Intersection	AM Peak Hour	PM Peak Hour
Willey Street and High Street	870	1,367
Willey Street and Spruce Street	935	1,447
Willey Street and Price Street	609	960

4.2 Average Daily Traffic (ADT) Volumes

2011 Average Daily Traffic (ADT) Volumes were obtained from the West Virginia Department of Transportation's website. Table 2 and Figure 3 summarize the available ADTs for the study area.

Table 2. 2011 Average Daily Traffic Volumes

Location	Average Daily Traffic Volume
High Street north of Willey Street	2,396
Spruce Street south of Willey Street	10,030
Willey Street east of Spruce Street	11,522

5.0 TRIP GENERATION AND DISTRIBUTION

As indicated earlier, the proposed development will consist of 92 apartment units and approximately 3,500 SF of retail/commercial space. Each of the apartment units will provide four bedrooms for a total of 368 beds. Additionally, the development will include the provision of a three-level parking garage containing 126 parking spaces.

5.1 Trip Generation

Trip generation estimates are generally developed utilizing the Institute of Transportation Engineers (ITE) publication *Trip Generation*. However, the publication does not provide a land use code for student housing. One of the most comprehensive trip generation studies related to student housing was conducted for the University of Minnesota. This study examined the trip generation characteristics of six typical student housing apartment buildings ranging from 44 to 135 units per building based on number of units, number of beds, and number of parking spaces. The entire summary of this study is included as Appendix D. The trip generation rates obtained from this study were applied to the proposed development to yield the estimated number of trips shown in Table 3 based on the three different independent variables.

Table 3. Trip Generation Estimates by Independent Variable

Independent Variable	AM Peak Hour	PM Peak Hour
	Total Trips	Total Trips
92 Apartment Units	12	22
368 Bedrooms	26	48
124 Parking Spaces	16	33

Utilizing the research rates appears to yield a reasonable estimate of trips for the proposed use. To provide a conservative analysis, the estimates based on number of bedrooms were utilized for this study.

For the commercial portion of the development, ITE Land Use Code 814 - Specialty Retail Center was utilized since the building area is fairly small and will likely provide a variety of specialized stores. Also, with the limited number of available studies, the average rates for peak hour of generator were utilized. A summary of the total trips for the proposed development is illustrated in Table 4.

**Proposed Mixed-Use Residential/Commercial Development
at 494 Spruce Street
Traffic Impact Study**

Table 4. 494 Spruce Trip Generation Estimates

Land Use	AM Peak Hour			PM Peak Hour			Daily		
	In	Out	Total	In	Out	Total	In	Out	Total
368 Bedrooms	11	15	26	25	23	48	261	262	523
3,500 SF Retail	12	12	24	10	8	18	78	77	155
Total	23	27	50	35	31	66	339	339	678

5.2 Trip Distribution

In order to distribute the site generated traffic to the adjacent street system, the trip generation per parking level, and the associated trip generation by access point, was determined. The proportion of parking spaces for each parking level is summarized in Table 5.

Table 5. Proportion of Parking Spaces by Parking Level

Parking Level	# of Parking Spaces	Access Location	% of Total Parking
Level P1	41	Spruce Street	33%
Level P2	48	Willey Street	38%
Level 01	37	Willey Street	29%
Total	126		100%

Therefore, it is estimated that 67% of the site generated traffic will utilize the Willey Street access, and the remaining 33% will use the Spruce Street access. Applying these percentages to the anticipated trip generation yields the projected trips by access location shown in Table 6.

Table 6. Projected Trips by Parking Level/Access Location

Parking Level	Access Location	AM Peak Hour			PM Peak Hour			Daily		
		In	Out	Total	In	Out	Total	In	Out	Total
Level P1	Spruce	8	9	17	12	10	22	112	112	224
Level P2/01	Willey	15	18	33	23	21	44	227	227	454
Total		23	27	50	35	31	66	339	339	678

The overall distribution of site traffic was based on its proximity to the campus and existing travel patterns in the study area. Since the development will consist of student housing, it is anticipated that the majority of the site generated traffic (90%) will have origins and destinations to campus. Considering this, Table 7 outlines the anticipated distribution of site generated traffic.

It should be noted that it has been agreed that left-turn movements from the Willey Street access will be restricted.

**Proposed Mixed-Use Residential/Commercial Development
at 494 Spruce Street
Traffic Impact Study**

Table 7. Trip Distribution Pattern by Access Location

Direction	Spruce Street		Willey Street	
	Inbound	Outbound	Inbound	Outbound
Willey Street West	68%	68%	68%	0%
High Street North	22%	0%	22%	0%
High Street South	0%	7%	0%	7%
Spruce Street North	0%	22%	0%	0%
Spruce Street South	7%	0%	7%	0%
Willey Street East	3%	3%	3%	3%
Price Street North	0%	0%	0%	90%

Applying the above distribution pattern to the anticipated site generated traffic yields the peak hour site generated traffic illustrated in Figure 4.

6.0 PROJECTED TRAFFIC VOLUMES

As directed by the West Virginia Division of Highways and the City of Morgantown, projected traffic volumes for the study area should include the application of a background growth rate and anticipated site generated traffic from other area developments.

6.1 Other Area Development Trip Generation and Distribution

In addition to the proposed development, several other area developments are anticipated to be constructed during the same timeframe, including Central Place and College Park. Central Place is a proposed 120 unit apartment complex development to be located immediately adjacent to 494 Spruce that will provide access directly opposite of Price Street. College Park is located between Mountaineer Middle School and North Willey Street and will provide 224 apartment units with 567 bedrooms. Anticipated trip generation for both developments was based on the research study cited earlier in this report and is summarized in Table 8.

Table 8. Other Area Development Trip Generation Estimates

Development	AM Peak Hour			PM Peak Hour			Daily		
	In	Out	Total	In	Out	Total	In	Out	Total
Central Place	14	19	34	32	30	62	341	341	682
College Park	17	23	40	39	35	74	402	403	805

The distribution pattern utilized to distribute site generated traffic for the 494 Spruce development was also applied to the Central Place development. For College Park, it is anticipated that 10% of the site generated traffic will pass through the study area via US Route 119. Figures 5 and 6 illustrate the resulting peak hour site generated traffic for each development.

6.2 2016 Projected Traffic Volumes

The projected opening year for the 494 Spruce development is 2016. Therefore, a 2% per year growth rate was applied to the 2014 Existing Traffic Volumes to achieve 2016 base traffic volumes. This growth rate is appropriate for the Morgantown area and was supplied by DOH. Site generated traffic for the Central Place and College Park developments was then added to achieve the 2016 peak hour traffic volumes without the 494 Spruce development, which are illustrated in Figure 7. The 494 Spruce site generated traffic was then added to achieve the 2016 peak hour traffic volumes including all three developments, as shown in Figure 8.

**Proposed Mixed-Use Residential/Commercial Development
at 494 Spruce Street
Traffic Impact Study**

For comparison, Table 9 shows the total traffic volumes during the peak hours at each study intersection for the future scenarios of 2016 traffic volumes including Central Place and College Park generated traffic and 2016 traffic volumes including all developments. The table also shows the percentage increase in traffic due to the 494 Spruce development, compared to the 2016 traffic volumes excluding 494 Spruce.

Table 9. Total 2016 Projected Peak Hour Intersection Volumes

	2016 Excluding 494 Spruce		2016 Full Development	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
	Willey St and High St	934	1,477	962 (+3%)
Willey St and Spruce St	1,009	1,573	1,033 (+2%)	1,605 (+2%)
Willey St and Price St	671	1,069	689 (+3%)	1,091 (+2%)

As illustrated in the table, the addition of site generated traffic from the 494 Spruce development results in only a 2-3% increase in traffic volume at the study intersections.

7.0 OPERATIONAL ANALYSIS

Utilizing the Synchro traffic analysis software and the methodologies outlined in the *Highway Capacity Manual (HCM) 2010*, published by the Transportation Research Board, operational analyses were performed for each study intersection. Based on this methodology, the operational characteristics of an intersection can be identified based on the assignment of a Level of Service (LOS). LOS ranges from A to F, with A representing the best operating conditions with little delay, and F representing conditions at or beyond capacity with substantial delay and queuing.

Each study intersection was analyzed in two ways: using Synchro traffic analysis and the HCM 2010 module that is part of Synchro. The intersections were analyzed both ways because the methodologies are slightly different:

- Synchro analysis allows for consideration of an exclusive pedestrian walk phase at signalized intersections. This is an important consideration, since the intersections of Willey Street/High Street and Willey Street/Spruce Street have exclusive pedestrian walk phases.
- The HCM 2010 module allows the user to enter “initial queue,” which is the queue present at the start of the analysis period for each movement group.
- Synchro analysis does not consider initial queue and HCM 2010 analysis does not consider exclusive pedestrian walk phases at signalized intersections.

The analyses show that the Synchro analysis, which considers the exclusive pedestrian walk phase, was more conservative in reporting traffic operations. Therefore, the results reported in this section are from the Synchro analysis.

Tables 10 through 13 show existing and future LOS and delay for each study intersection and the new development access driveways. The Synchro analysis summaries are included in Appendix E.

**Proposed Mixed-Use Residential/Commercial Development
at 494 Spruce Street
Traffic Impact Study**

Table 10. Willey Street and High Street (US Route 119 Southbound) Operational Analysis

	Existing Conditions		2016 Excluding 494 Spruce		2016 Full Development	
	AM LOS / Delay (s/veh)	PM LOS / Delay (s/veh)	AM LOS / Delay (s/veh)	PM LOS / Delay (s/veh)	AM LOS / Delay (s/veh)	PM LOS / Delay (s/veh)
EB thru/ right	C / 21.6	F / 103.4	C / 28.5	F / 144.9	C / 34.8	F / 169.8
WB left	D / 35.2	F / 93.4	D / 41.2	F / 93.5	D / 45.1	F / 93.3
WB thru	C / 21.0	B / 18.2	C / 21.2	B / 18.9	C / 21.2	B / 18.9
SB thru/ left	B / 18.7	C / 27.0	B / 19.0	C / 27.8	B / 19.3	C / 28.4
SB right	A / 0.1	A / 1.0	A / 0.1	A / 1.0	A / 0.1	A / 1.0
Overall	C / 25.9	E / 71.0	C / 29.9	F / 84.9	C / 32.9	F / 93.8

Table 11. Willey Street and Spruce Street (US Route 119 Northbound) Operational Analysis

	Existing Conditions		2016 Excluding 494 Spruce		2016 Full Development	
	AM LOS / Delay (s/veh)	PM LOS / Delay (s/veh)	AM LOS / Delay (s/veh)	PM LOS / Delay (s/veh)	AM LOS / Delay (s/veh)	PM LOS / Delay (s/veh)
EB thru/ left	B / 14.9	B / 12.2	B / 13.1	B / 13.2	B / 13.2	B / 13.9
WB thru/ right	D / 40.6	C / 29.7	D / 40.1	C / 33.1	D / 40.1	C / 33.1
NB left	A / 8.1	B / 17.9	A / 9.1	B / 18.4	A / 9.2	B / 18.6
NB thru	A / 6.4	B / 13.2	A / 7.1	B / 13.3	A / 7.2	B / 13.3
NB right	A / 1.7	A / 3.9	A / 1.9	A / 4.0	A / 1.9	A / 4.0
Overall	B / 15.5	B / 15.3	B / 16.1	B / 16.7	B / 15.9	B / 16.8

Table 12. Willey Street and Price Street Operational Analysis

	Existing Conditions		2016 Excluding 494 Spruce		2016 Full Development	
	AM LOS / Delay (s/veh)	PM LOS / Delay (s/veh)	AM LOS / Delay (s/veh)	PM LOS / Delay (s/veh)	AM LOS / Delay (s/veh)	PM LOS / Delay (s/veh)
EB left/ thru/ right	A / 8.0	A / 1.4	A / 0.9	A / 1.4	A / 1.6	A / 1.9
WB left/ thru/ right	A / 7.9	A / 0.4	A / 0.6	A / 0.6	A / 0.6	A / 0.6
NB left/ thru/ right	B / 12.3	C / 20.9	C / 21.6	F / 64.0	C / 23.9	F / 77.8
SB left/ thru/ right	B / 11.7	C / 19.0	B / 11.9	C / 22.2	B / 12.2	C / 24.2
Overall	B / 12.3	C / 20.9	C / 21.6	F / 64.0	C / 23.9	F / 77.8

Table 13. Proposed Accesses Operational Analyses

	2016 Full Development	
	AM LOS / Delay (s/veh)	PM LOS / Delay (s/veh)
NB onto Willey St	B / 10.3	B / 14.0
WB onto Spruce St	A / 9.8	B / 10.8

The results of the operational analysis indicate that there will be no degradation of LOS as a result of anticipated traffic from the 494 Spruce development compared to the no-build condition.

8.0 QUEUE ANALYSIS

A queuing analysis was conducted for the study intersections using the Synchro traffic analysis software package distributed by TrafficWare. The 95th percentile queues for the AM and PM peak periods for each scenario were compared to the existing auxiliary lane lengths to determine if the storage lanes are adequate. If the lane is not an auxiliary lane, the distance to the next intersecting street is shown.

Tables 14 through 17 show the results of the existing and future queue analysis for each study intersection and the new development access driveways.

Table 14. Willey Street and High Street (US Route 119 Southbound) Queue Analysis

	Existing Conditions		2016 Excluding 494 Spruce		2016 Full Development		Available Storage (ft)
	AM 95 th Percentile Queue (ft)	PM 95 th Percentile Queue (ft)	AM 95 th Percentile Queue (ft)	PM 95 th Percentile Queue (ft)	AM 95 th Percentile Queue (ft)	PM 95 th Percentile Queue (ft)	
EB thru/ right	88	535	112	609	132	651	250
WB left	252	467	289	506	281	509	250
WB thru	177	163	185	191	187	194	250
SB thru/ left	43	142	47	154	52	162	350
SB right	0	0	0	0	0	0	60

Table 15. Willey Street and Spruce Street (US Route 119 Northbound) Queue Analysis

	Existing Conditions		2016 Excluding 494 Spruce		2016 Full Development		Available Storage (ft)
	AM 95 th Percentile Queue (ft)	PM 95 th Percentile Queue (ft)	AM 95 th Percentile Queue (ft)	PM 95 th Percentile Queue (ft)	AM 95 th Percentile Queue (ft)	PM 95 th Percentile Queue (ft)	
EB thru/ left	24	74	25	90	27	98	240
WB thru/ right	204	285	221	337	221	337	190
NB left	129	225	143	237	148	243	250
NB thru	32	84	35	87	36	88	250
NB right	29	35	31	36	31	36	250

**Proposed Mixed-Use Residential/Commercial Development
at 494 Spruce Street
Traffic Impact Study**

Table 16. Willey Street and Price Street Queue Analysis

	Existing Conditions		2016 Excluding 494 Spruce		2016 Full Development		Available Storage (ft)
	AM 95 th Percentile Queue (ft)	PM 95 th Percentile Queue (ft)	AM 95 th Percentile Queue (ft)	PM 95 th Percentile Queue (ft)	AM 95 th Percentile Queue (ft)	PM 95 th Percentile Queue (ft)	
	EB left/ thru/ right	2	4	2	4	4	
WB left/ thru/ right	1	1	1	1	1	1	470
NB left/ thru/ right	2	7	29	75	32	86	125
SB left/ thru/ right	5	23	5	29	6	32	300

Table 17. Proposed Accesses Queue Analyses

	2016 Full Development	
	AM 95 th Percentile Queue (ft)	PM 95 th Percentile Queue (ft)
	NB onto Willey St	2
WB onto Spruce St	1	1

While existing traffic volumes currently queue beyond the available storage for several intersection movements, the results of the queue analysis indicate that the addition of site generated traffic from the proposed development will not result in exceeding the available storage length for movements with adequate storage capacity.

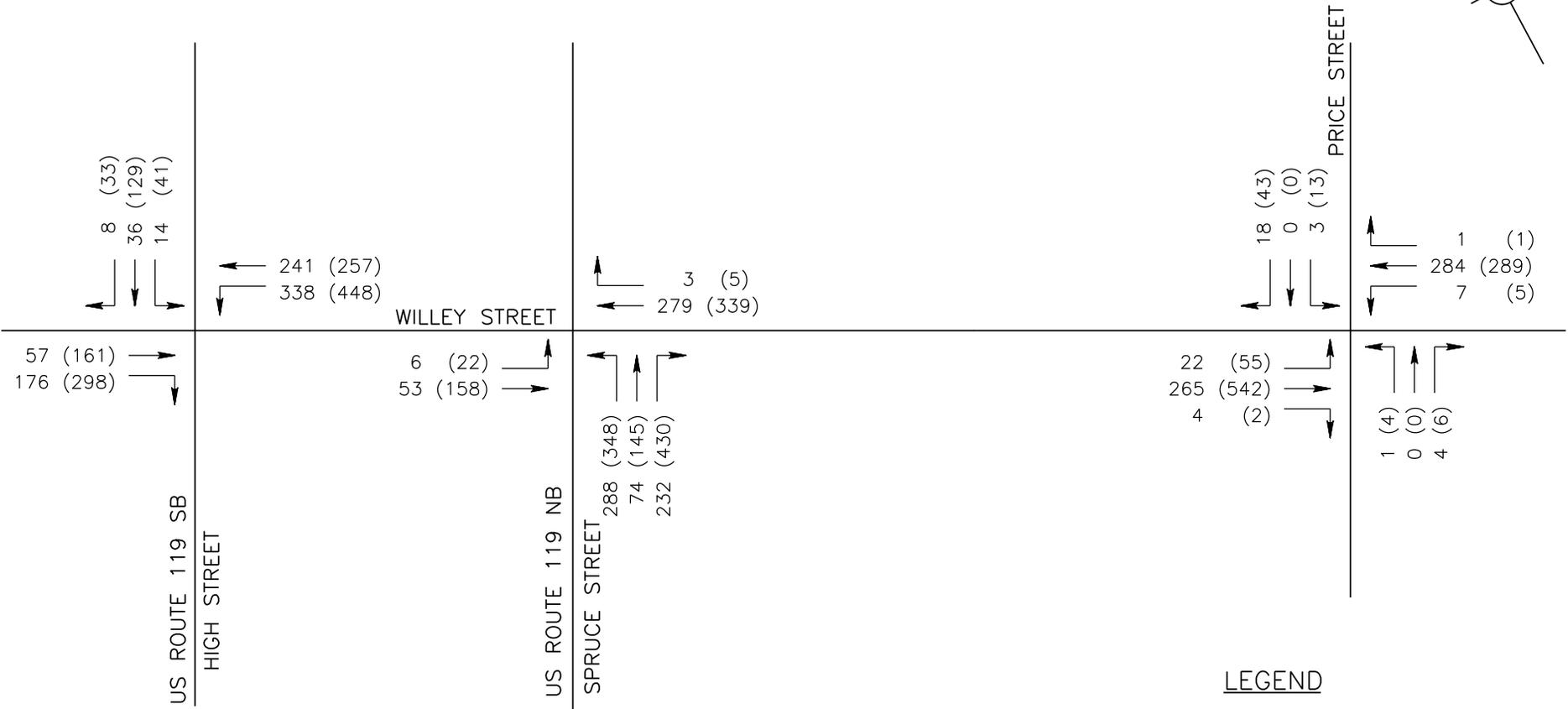
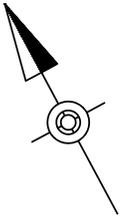
9.0 CONCLUSIONS

This Traffic Impact Study was performed in accordance with West Virginia DOH TED 106-2 to determine if the 494 Spruce residential/commercial development would adversely affect the LOS of the following intersections:

- Willey Street and High Street (US Route 119 Southbound)
- Willey Street and Spruce Street (US Route 119 Northbound)
- Willey Street and Price Street.

It has been determined that the proposed development will have a minor impact on the adjacent roadway system, and as such no roadway, traffic signal, or other system improvements are recommended based on the following:

- The addition of site generated traffic from the proposed development results in only a minor increase in traffic volumes for the study intersections.
- The results of the operational analysis indicate that a degradation of LOS occurs at the intersection of Willey Street and Price Street during the AM Peak Hour, primarily due to the growth in background traffic not related to the 494 Spruce development. There is no degradation of LOS as a result of anticipated traffic from the 494 Spruce development compared to the no-build condition.
- The results of the queue analysis indicate that the addition of site generated traffic from the proposed development will not result in exceeding the available storage length for intersection movements with adequate storage capacity.



LEGEND

- A - AM PEAK HOUR VOLUME
- (A) - PM PEAK HOUR VOLUME

FIGURE 2

**494 SPRUCE
2014 PEAK HOUR
TRAFFIC VOLUMES**



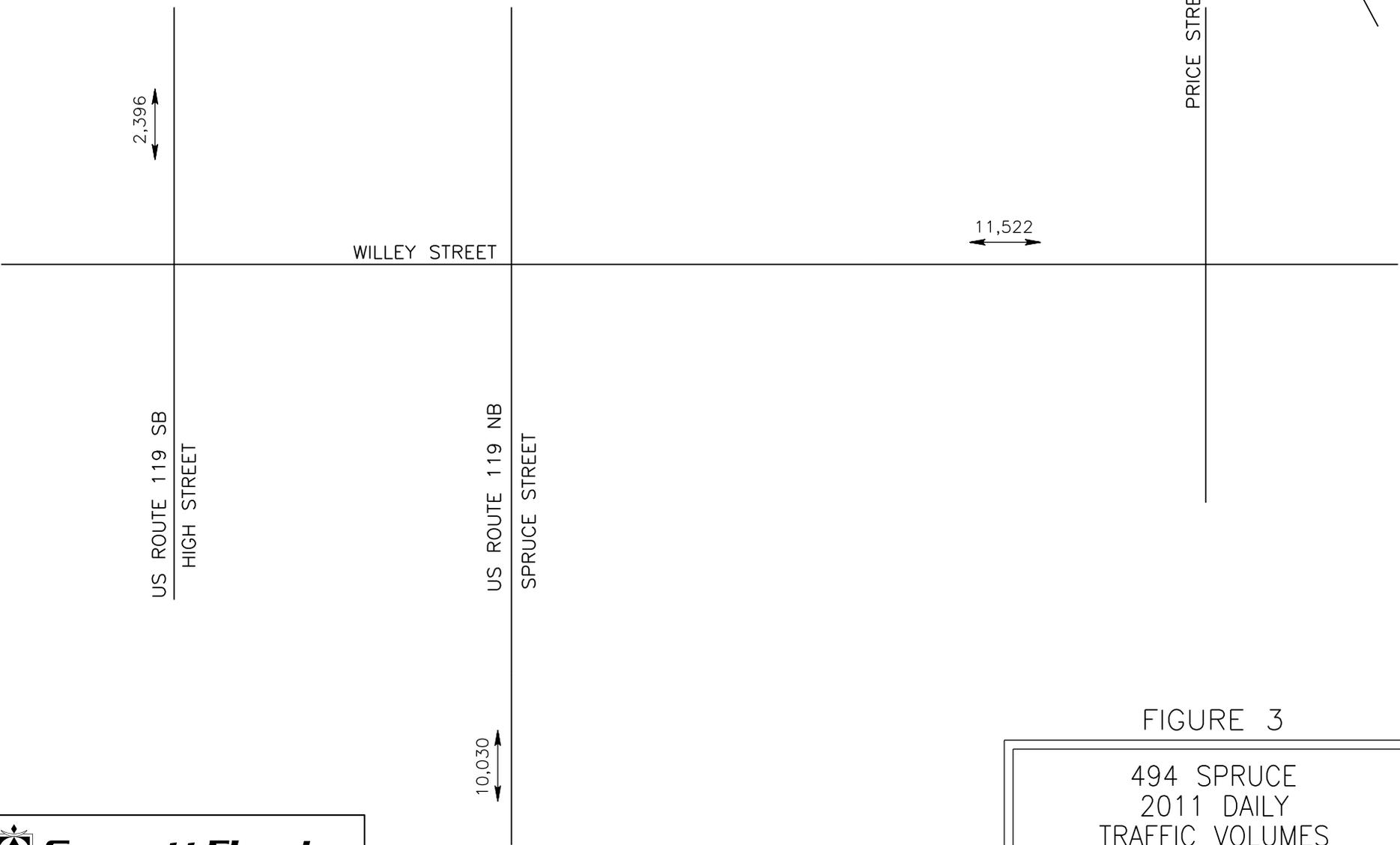
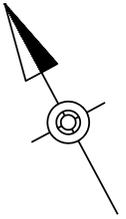
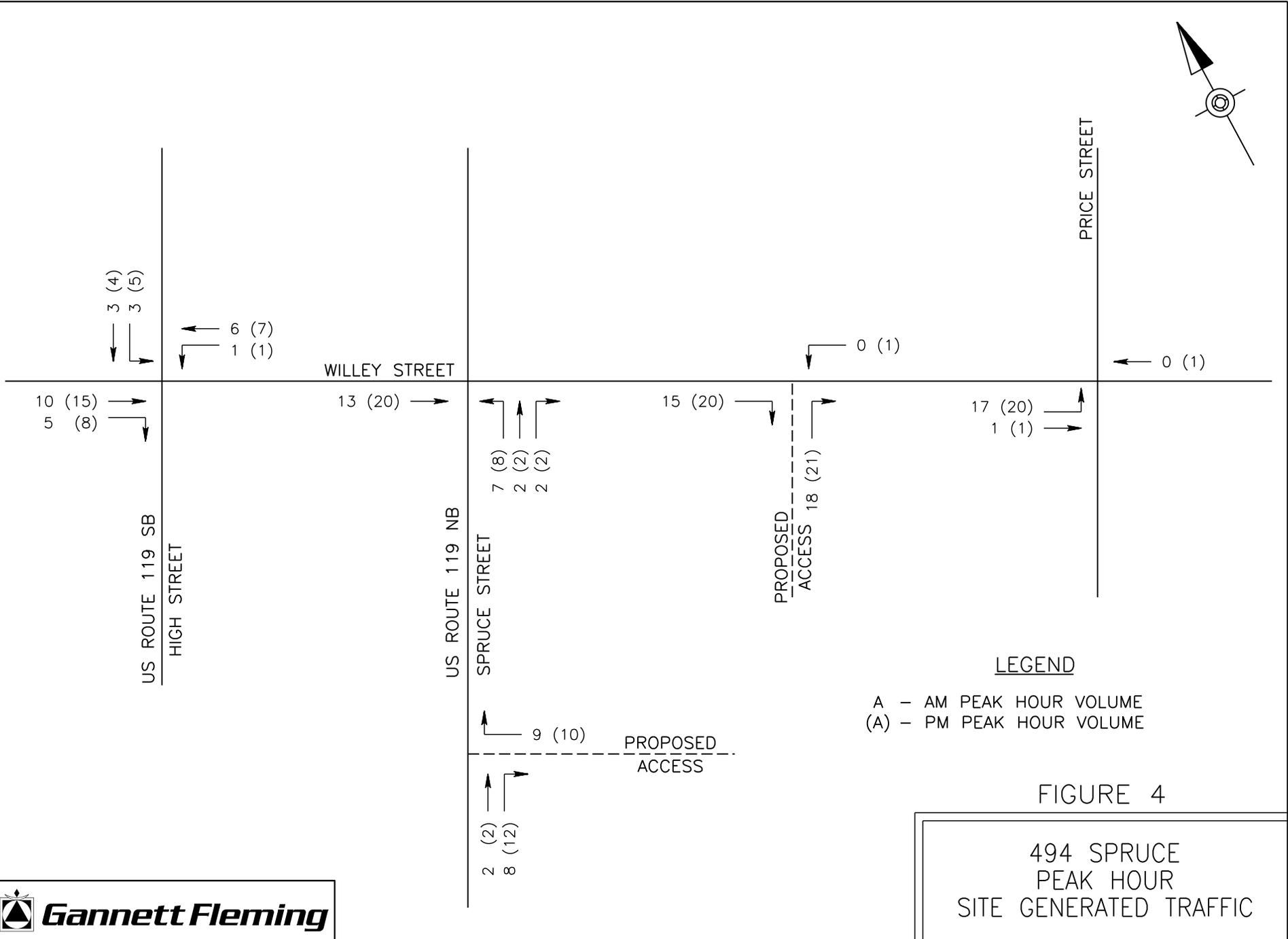
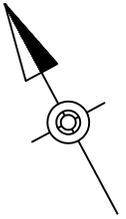


FIGURE 3

494 SPRUCE
2011 DAILY
TRAFFIC VOLUMES





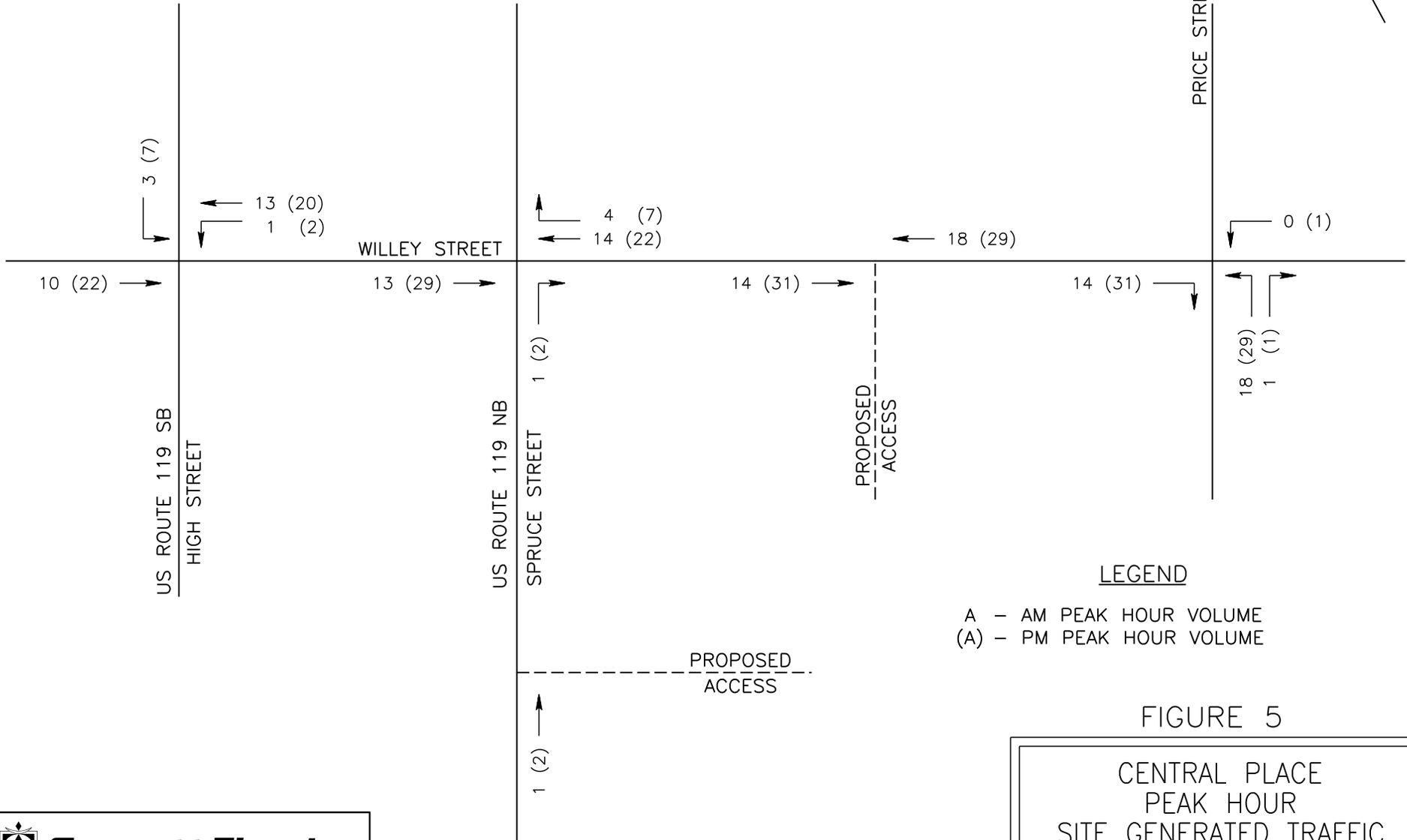
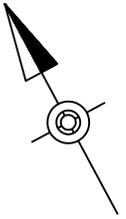
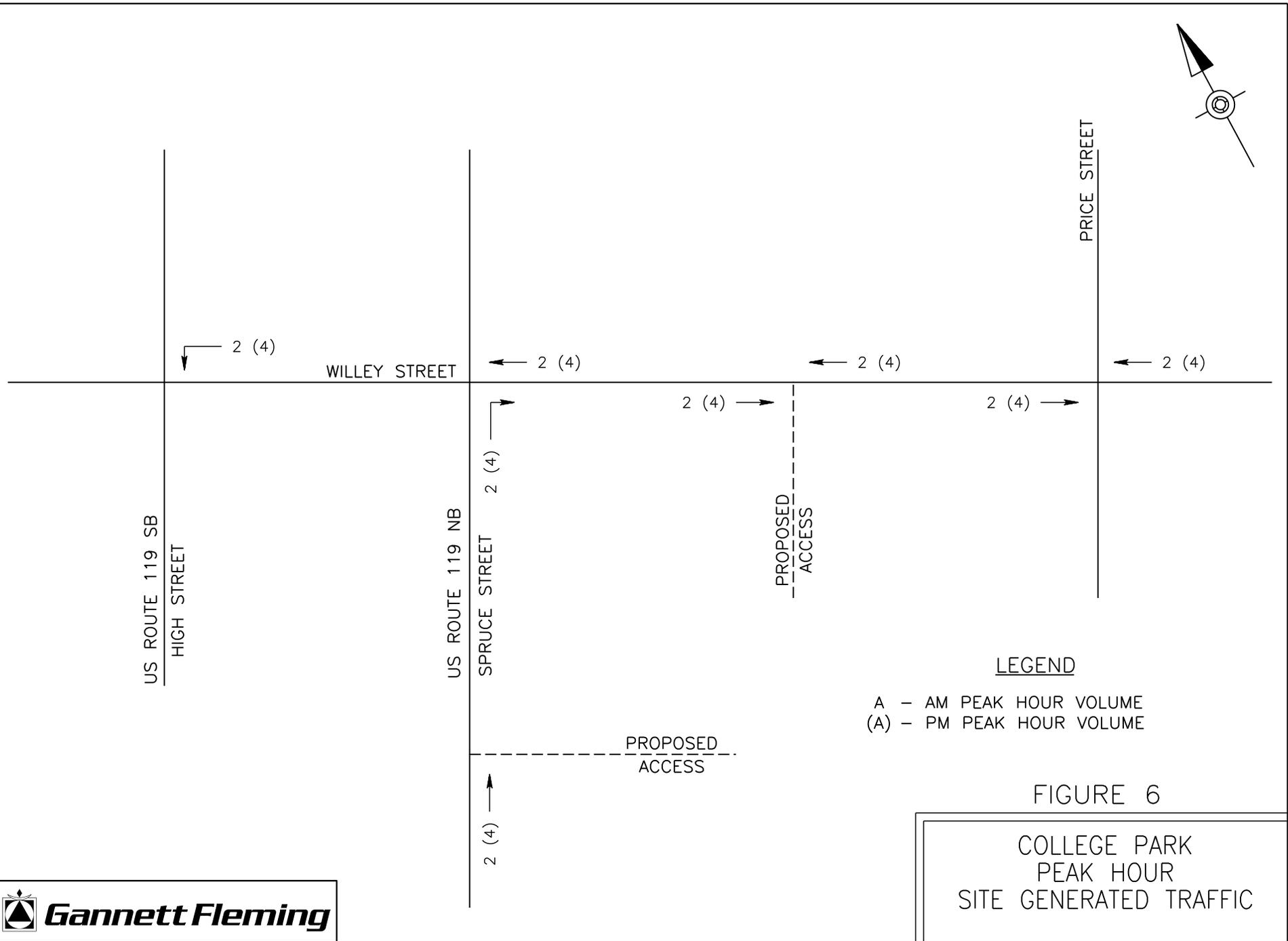
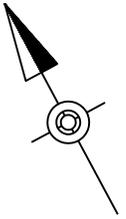


FIGURE 5
CENTRAL PLACE
PEAK HOUR
SITE GENERATED TRAFFIC





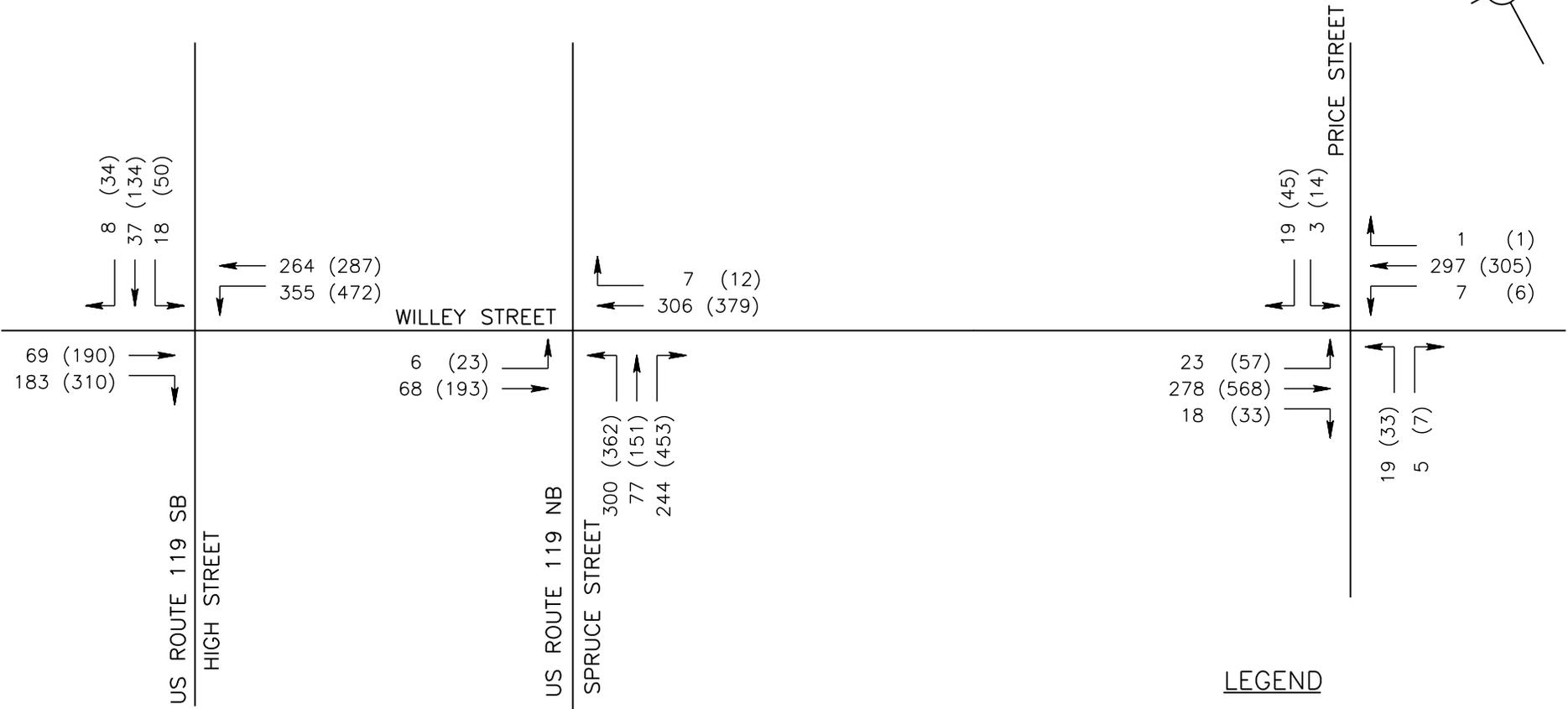
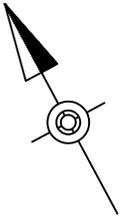
LEGEND

- A - AM PEAK HOUR VOLUME
- (A) - PM PEAK HOUR VOLUME

FIGURE 6

COLLEGE PARK
PEAK HOUR
SITE GENERATED TRAFFIC





LEGEND

- A - AM PEAK HOUR VOLUME
- (A) - PM PEAK HOUR VOLUME

FIGURE 7

2016 PEAK HOUR
TRAFFIC VOLUMES
INCLUDING CENTRAL PLACE
AND COLLEGE PARK



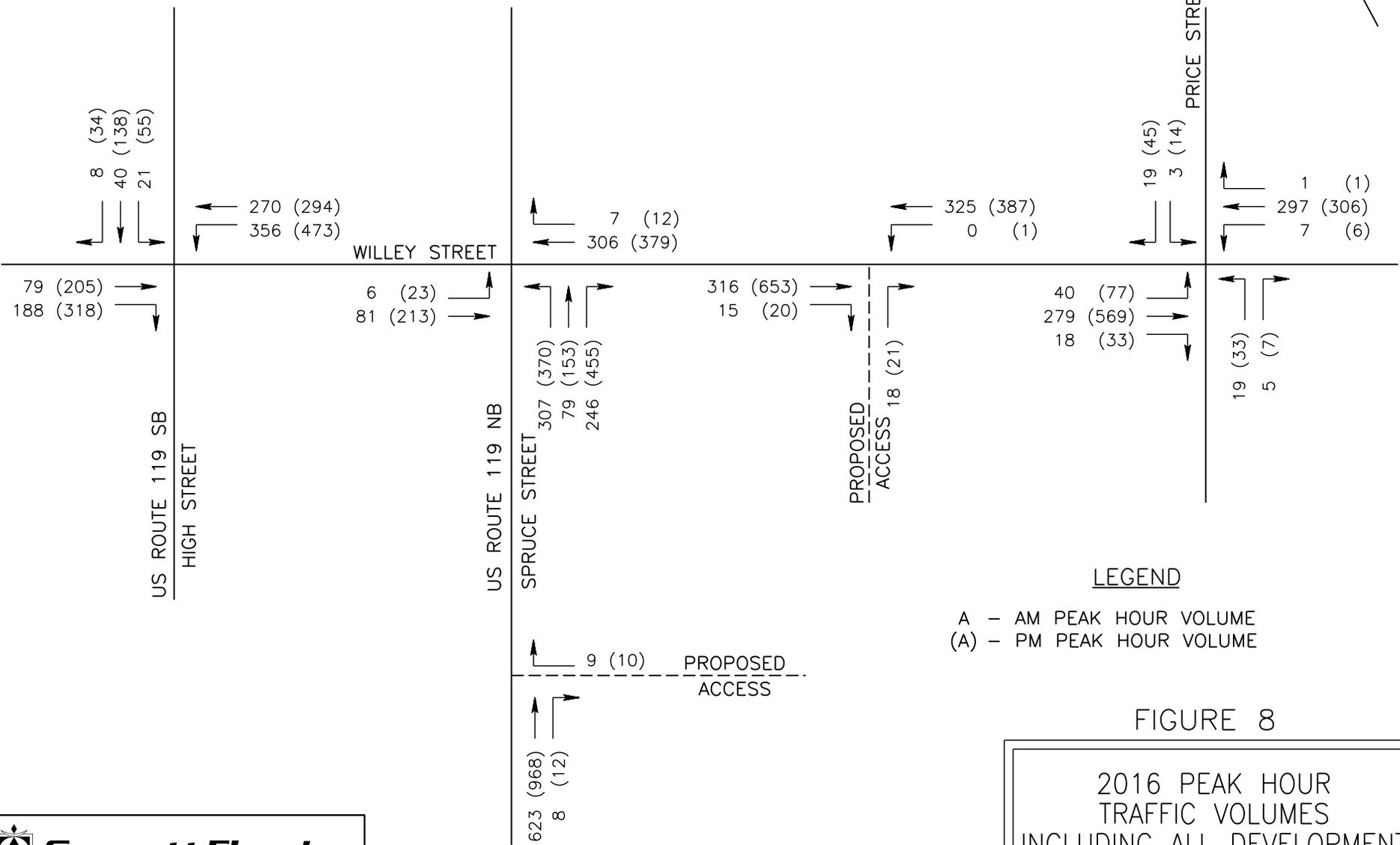
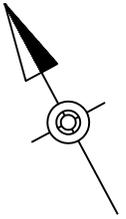


FIGURE 8

2016 PEAK HOUR
TRAFFIC VOLUMES
INCLUDING ALL DEVELOPMENT





Eric Veidt
14132

**Witt Economics LLC
P.O. Box 18146
Morgantown WV 26507**

September 3, 2014

Dan Hrankowsky
Director of Design
CA Student Living
161 North Clark Suite 4900
Chicago IL 60601

Dear Dan,

The following information is provided as a supplement to my report, *The Economic Impact of Proposed Student Housing on the City of Morgantown and Monongalia County*, which was discussed at the Morgantown Planning Commission on June 12, 2014.

Attached you will find an abbreviated curriculum vitae. I have been actively involved in economic development research and service since I arrived at West Virginia University in 1970. Some key highlights include:

- Served as a principal investigator or co-PI on over \$6 million in sponsored research and contracts with organizations. Examples include the U.S. Environmental Protection Agency, U.S. Department of Justice, West Virginia Legislature, West Virginia Development Office, West Virginia Division of Energy, The Greenbrier Resort, West Virginia Oil and Gas Association, and the Claude Worthington Benedum Foundation, among others.
- As director of the WVU Bureau of Business and Economic Research, I directed a team of MA and Ph.D. economists focused on economic development within West Virginia. We issued regular economic and demographic forecasts, conducted industry and labor market studies, researched state and local public finance issues, and conducted public policy research. The BBER website www.bber.wvu.edu provides additional information about our past research publications.
- The Monongalia County Commission appointed me to the Monongalia County Development Authority in 1993, where I served until 2009. From 1996-2009 I was the vice president of the authority.
- Since retiring from WVU I formed Witt Economics LLC to provide economic research and analysis to a variety of organizations. I have used IMPLAN to conduct economic impact studies for Braskem America, West Virginia Wesleyan College, West Virginia School of Osteopathic Medicine, Camp

Caesar (Webster County), and CA Student Living. The study funded by Braskem America, *Building Value from Shale Gas: The Promise of Expanding Petrochemicals in West Virginia*, has been widely quoted and used to convey the potential associated with construction and operation of a world class ethane cracker, associated polyethylene plants and downstream plastics manufacturing within West Virginia.

- I have provided expert witness testimony on a variety of cases before the West Virginia Public Service Commission. Several of these cases involved research reports prepared using IMPLAN.

I understand that Planning Commission members raised questions about the students' expenditure in downtown Morgantown. The significant economic impacts associated with building occupancy reported in the tables excluded expenditures by tenants in downtown Morgantown. As I indicated in the report WVU provides estimates of the estimated costs of attendance expected by student seeking financial aid. These estimates include nearly \$2,000 per student (and as much as \$3,000 or more) for miscellaneous living expenses.

Because of this omission I stated that in a given year the building occupants could add upwards of nearly \$700,000 in spending in retail stores, restaurants, food stores, entertainment, book stores, drug stores, beauty and hair salons, etc., much of which will be in the downtown due to the proximity of apartments to the business community. An examination of Main Street Morgantown businesses shows that many of these businesses cater to students as well as the general population. Thus this development, along with other developments in the Morgantown urban core, should increase the commercial viability of locally owned small business.

Additional questions have been raised about the use of IMPLAN in the calculations of the economic impacts associated with the construction and operation of the project. Central to IMPLAN is an input-output model with upwards of 420 industry sectors. The computational software permits a trained analyst to determine the economic impact of new businesses, business expansion/contraction, and closures. The IMPLAN system is used by numerous federal, state and local agencies as well as private businesses and economic development organizations. Further information can be found at www.implan.com.

I regret not being able to attend to answer questions but a previous scheduled out of state trip precludes my attendance.

Yours truly,



Tom S. Witt, Ph.D.
Managing Director and Chief Economist

Curriculum Vitae (Abbreviated)

Tom S. Witt, Ph.D.
Managing Director and Chief Economist
Witt Economics LLC
Office: P.O. Box 18146
Morgantown WV 26508

- Education:** Ph.D. Economics, Washington University (St. Louis), 1974
MA Economics, Washington University (St. Louis), 1968
BA Economics, Oklahoma State University, 1966
- Work Experience:** College of Business and Economics, West Virginia University
Professor of Economics Emeritus, Awarded in 2012 Upon Retirement From WVU
Associate Dean for Research and Outreach, 1994-2006, 2008-2012
Director, Bureau of Business and Economic Research, 1986-2012
Acting Associate Dean, 1985-1986
Acting Director, Bureau of Business Research, 1985
Professor of Economics, 1980-2012
Associate Professor of Economics, 1975-80
Assistant Professor of Economics, 1970-75
Graduate School, West Virginia University, Acting Assistant Dean, 1977-78

Professional Memberships American Economic Association

Witt Economics LLC Publications

- Economic Impact of Moundsville Power on the West Virginia Economy*, August 2014
The Economic Impact of Proposed Student Housing on the City of Morgantown and Monongalia County, June 2014
Building Value From Shale Gas: The Promise of Expanding Petrochemicals in West Virginia, December 2013
Economic Contributions of Camp Caesar on Webster County and West Virginia 2011 and 2012, November 2013
Economic Impact of West Virginia Wesleyan College FY2012, March 2013
Economic Impact of the West Virginia School of Osteopathic Medicine FY2012, March 2013

Selected Recent Scholarly Publications

- Kobus, H., Houck, M., Speaker, P., Riley, R., Witt, T. (2011). Managing Performance in the Forensic Sciences – Expectations in Light of Limited Budgets. *Forensic Science Policy & Management*, 2(2), 36 - 43.
- Houck, M., Riley, R., Speaker, P., Witt, T. (2009). FORESIGHT: A Business Approach to Improving Forensic Science Services. *Forensic Science Policy & Management* 1(2), 85-95.
<http://www.tandf.co.uk/journals>
- Witt, T. (2011). The Natural Gas Industry's Role in West Virginia's Economic Development. *Views and Visions*-publication of Bowles Rice McDavid Graff & Love LLP. (Spring 2011), 14-15.
- Higginbotham, A., Sen, A., Gurley - Calvez, T., Witt, T. (2008). Teacher Shortages: National and Regional Perspectives. *West Virginia Business and Economic Review*, 15.
- Witt, T. (2004). Does Manufacturing Have A Future in West Virginia? *Capacity*.

Witt, T., Bowen, E., Manzi, P. and Meinert, T. (2012). Fossil Energy Opportunities for West Virginia. West Virginia Division of Energy.

Witt, T., Higginbotham, A., Christiadi, C., Meinert, T., Davis, A., Bison-Huckaby, M. (2011) Braxton County Educational Needs Analysis. Morgantown WV: WVU Bureau of Business and Economic Research.

Witt, T., Godfrey, A. H., Meinert, T. (2011). The Economic Impact of the Charles Town Thoroughbred Horse Racing Industry on the Jefferson County and West Virginia Economies 2010. Morgantown WV: WVU Bureau of Business and Economic Research. www.bber.wvu.edu

Higginbotham, A., Pellillo, A., Gurley - Calvez, T., Witt, T. (2010). The Economic Impact of the Natural Gas Industry and the Marcellus Shale Development in West Virginia in 2009. Morgantown WV: Bureau of Business and Economic Research. www.bber.wvu.edu

Higginbotham, A., Pennington, E., Christiadi, C., Witt, T. (2010). Economic Impact of West Virginia Higher Education Institutions FY2008 (pp. 87). Morgantown WV: Bureau of Business and Economic Research. www.bber.wvu.edu

Witt, T. (2010). Financing West Virginia's Highways: Challenges and Opportunities. Morgantown, WV: Bureau of Business and Economic Research, West Virginia University. www.bber.wvu.edu

Witt, T. (2009). West Virginia Wage Survey 2008 and West Virginia University vs. Other Employers Wage Survey 2008. WVU Bureau of Business and Economic Research.

Witt, T., Gregory, A. C. (2008). An Economic Profile of the Biosciences Industry in West Virginia. Morgantown WV: Bureau of Business and Economic Research, West Virginia University. www.bber.wvu.edu

Higginbotham, A., Witt, T., Gurley - Calvez, T. (2008). Teacher Shortages: National and Regional Perspectives. West Virginia Business and Economic Review, Bureau of Business and Economic Research, West Virginia University. www.bber.wvu.edu.

Higginbotham, A., Gurley - Calvez, T., Sen, A., Witt, T. (2007). Cost Differences Among School Districts: The Issue of Student Density. Bureau of Business and Economic Research, West Virginia University. www.bber.wvu.edu.

Higginbotham, A., Witt, T., Gurley - Calvez, T., Sen, A. (2007). Teacher Shortages: National and Regional Perspectives. Bureau of Business and Economic Research, West Virginia University. www.bber.wvu.edu.

Witt, T., Leguizamon, S. (2007). Tourism and the West Virginia Economy. Morgantown WV: Bureau of Business and Economic Research, West Virginia University. www.bber.wvu.edu.

Witt, T. (2007). Financing West Virginia's Highways: An Update. Morgantown, WV: Bureau of Business and Economic Research, West Virginia University. www.bber.wvu.edu.

Research Grants and Contracts

Dr. Witt has served as project director, principal investigator or co-principal investigator on over \$6 million dollars of grants and contracts while at West Virginia University. Examples of awarding institutions include U.S. Environmental Protection Agency, U.S. Department of Justice, West Virginia Legislature, West Virginia Department of Transportation, West Virginia Division of Energy, West Virginia Governors Office, West Virginia Oil and Natural Gas Association, West Virginia Coal Association, Claude Worthington Benedum Foundation, and many others.

Recent Professional and Public Service

Member, Blue Ribbon Commission on Highways, (2012-present).
Member, West Virginia Tax Modernization, Charleston WV. (2009 - 2011).
Member, West Virginia Interagency Housing Council, Charleston, WV. (2008 - 2011).
Appointed Representative from the Association for University Business and Economic Research, Council of Professional Associations on Federal Statistics, Washington, DC. (1989 - 2011).
Member, Governor's Unemployment Solutions Task Force, Charleston, WV. (2008 - 2009).
Member, Higher Education Policy Commission Statewide Master Plan Taskforce, Charleston, WV. (2006 -2007).
Member, Labor Market Information Work Team, Governor's Workforce Development Division, West Virginia Development Office. (2002 - 2003).
Member, Monongalia County Development Authority, 1993-2009. Served as vice president 1996-2009.

Expert Witness Presentations to the West Virginia Public Service Commission

Moundsville Power LLC (case 14-1221-E-CS)
Hope Gas, Inc., dba Dominion Hope (case 11-1263-G-PC)
PATH West Virginia Transmission Company, LLC, et.al. (case 09-0770-E-CN)
Trans-Allegheny Interstate Line Company (case 07-0508-E-CN)
West Virginia-American Water Company and Thames Water Aqua Holdings GMBH (case 01-1691-W-PC)

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The Economic Impact of Proposed Student Housing on the City of Morgantown and Monongalia County

June 5, 2014

Prepared by

Tom S. Witt, Ph.D.
Managing Director and Chief Economist
Witt Economics LLC
P.O. Box 18146
Morgantown WV 26507
304.376.9827
tomswitt@gmail.com

Introduction and Overview

In conjunction with this project, CA Student Living (hereafter CASL) has commissioned Witt Economics LLC to estimate the economic impacts of their proposed multistory student housing in downtown Morgantown. This report quantifies the economic impacts on the City of Morgantown budget as well as the Monongalia County economy.¹

Project Description

CASL has proposed construction and operation of a mixed-use, eleven-story building located at 494 Spruce Street in downtown Morgantown. The project site is owned and occupied by Veterans of Foreign Wars Post 548 and has been actively marketed for sale for the past 5-6 years. After redevelopment the new building will contain 92 four-bedroom units and 7,104 square feet of nonresidential space. Based on the plan currently before the Planning Commission, it is assumed that about 3,200+/- square feet of the total non-residential space will be leased for retail use.

This study used CASL project information on construction and operating costs to develop the economic impacts. All costs and estimated economic impacts are in terms of 2014 dollars. Construction costs are estimated at \$19 million exclusive of financing. Over the 20-month construction period 175,000 man-hours of labor will be used, averaging around 8,750 man-hours per month, which could be represented during the construction period at two different points as follows:

- In the early phase “Core & Shell” construction period, the work force is comprised of concrete workers, iron workers, plumbers, excavators, and other support trades
- In the later phase “Interiors” construction period, note the work force is comprised of framers, carpenters, electricians, plumbers, HVAC, and a host of critical support trades.

During the construction period the City of Morgantown will receive \$420,000 in business and occupation taxes and approximately \$120,000 in construction fees, including permits and licenses. ***The City of Morgantown is projected to receive a total of \$540,000 in revenues during the construction period.***

¹ The estimated taxes are based upon current rates within Monongalia County and the City of Morgantown. The City has submitted an application to the Municipal Home Rule Program for revisions to its finance options. While the current business and occupation tax would be reduced for retail, manufacturing, amusement and wholesale categories, it would be replaced by a municipal consumer sales and use tax. This report excludes any consideration of the consequences of this change on this specific project.

During its first year of operation building management will incur an annual payroll of \$210,000, general utilities of \$165,000 and rental unit utilities of \$165,000. Some of these utilities will be for water and sewage services provided by the Morgantown Utility Board. The City of Morgantown is projected to receive \$32,000 in business and occupation taxes and \$18,400 in fire service fees. Leasing of retail space is projected to generate an additional \$4,800 in business and occupation taxes to the City of Morgantown.

The building will also generate a total of \$250,000 in real property tax revenues to state and local governmental units of which the City of Morgantown will receive \$51,474.

The City of Morgantown is projected to receive a total of nearly \$107,000 in revenues during the first year of operation. A comparable amount will be generated thereafter on an annual basis.

Assuming at least a 30-year project lifespan, the building should generate at least \$3 million to the City of Morgantown.

Economic Impact Methodology

The economic impact methodology used in this report is provided by the IMPLAN[®] input-output modeling system.² This is an internationally recognized modeling software and data system, which has been used in numerous economic impact studies. The economic impacts reported below are based upon the estimated construction and operational expenses associated with this building. The *direct* impacts result from CASL's expenditures within the Monongalia County economy. These expenditures support various suppliers and vendors who in turn employ individuals and purchase goods and services from their suppliers. For example, CASL's purchases electricity from Mon Power during the construction period. This utility has power plants at Fort Martin, which are located within Monongalia County. This plant has employees and purchases goods and services from other suppliers, some of who are also reside within Monongalia County. To the extent the coal used at Fort Martin comes from Monongalia County mines, there are additional economic impacts. The *indirect* impact traces and quantifies all of the backward economic links resulting from CASL's expenditures during the construction phase.

The *induced* impact result from the expenditures in Monongalia County by CASL's employees or contract employees along with those of the employees at businesses supplying the project and, in turn, their suppliers' employees, etc. Examples of these purchases include groceries, medical services, utilities, housing, gasoline, etc. The total economic impact is the sum of the direct, indirect and induced economic impacts estimated using the IMPLAN[®] input-output modeling system.

Economic Impacts: Construction and Operation

Table 1 presents the economic impacts on the Monongalia County economy associated with the construction phase of the building project (years 2014 and 2015). In the short-run over 200 job years³ of employment are associated with the construction phase.

Table 1 Economic Impacts of Construction on Monongalia County

	Direct	Indirect	Induced	Total
Employee Compensation (millions 2014\$)	\$8.5	\$1.6	\$1.8	\$11.9
Value Added (millions 2014\$)	\$10.3	\$2.4	\$3.2	\$15.9
Output (millions 2014\$)	\$19.0	\$4.0	\$5.1	\$28.2
Employment (job years)	120	40	43	203

Notes: Rows may not sum due to rounding.

² For more information see www.implan.com.

³ A job year is one job over one year.

Table 2 presents the economic impacts associated with the first full year of full occupancy leasing of the apartments and retail space. The resulting employment is a combination of full and part-time jobs.

Table 2 Economic Impact of Occupancy on the Monongalia County Economy

	Direct	Indirect	Induced	Total
Employee Compensation (millions 2014\$)	\$0.4	\$0.2	\$0.1	\$0.8
Value Added (millions 2014\$)	\$2.5	\$0.5	\$0.2	\$3.1
Output (millions 2014\$)	\$3.6	\$0.7	\$0.3	\$4.7
Employment (jobs)	31	6	3	40
Notes: Rows may not sum due to rounding.				

These estimates, however, do not include the economic impacts associated with expenditures by 368 tenants in downtown Morgantown. During any year WVU releases estimates of the estimated cost of attendance expected by students seeking financial aid. ***These estimates include nearly \$2,000 per student (and as much as \$3,000+) for miscellaneous living expenses on retail, books and supplies. Thus, in a given year the occupants of the building could add upwards of nearly \$700,000 in spending in necessity retail stores, restaurants, food stores, entertainment, book stores, drug stores, beauty and hair salons, etc., in the downtown area.*** Financial institutions located downtown may also see an increase in financial deposits due to the proximity of these tenants.

Conclusions

These conclusions are based on the projected construction and operation costs and revenues associated with the plant as provided to Witt Economics LLC. The total economic impact is the sum of the direct, indirect and induced economic impacts estimated using the IMPLAN® input-output modeling system. Changes in the project cost and/or vendor locations may change the estimated economic impacts from those reported herein.

These impacts, however, can be viewed as conservative as they exclude other economic impacts associated with student renters. For example, additional student renters in the Morgantown downtown urban core provides an economic boost to the retail sales and services provided, in large part, to Main Street Morgantown businesses. Locating students close to the downtown campus of West Virginia University permits these students to shift their transportation options from cars and trucks to Mountain Line Transit Authority buses, motorcycles, bicycles and pedestrian modes. With the increasing costs of vehicle ownership and maintenance,

more young adults are seeking residential locations with more transportation alternatives.

One should not ignore the potential enhancement of Morgantown's economic potential that is validated through the significant corporate investment by a national firm in this signature downtown project. While many trumpet the attraction of national retail and restaurant chains to the Morgantown peripheries, this project firmly establishes downtown Morgantown as a good investment.

Finally, West Virginia University President Gordon Gee has expressed his interest in growing the student body to 40,000 students over time.⁴ Providing housing for these students close to campus permits accommodation of this growth in a sustainable, cost-effective manner that will encourage further revitalization of Downtown Morgantown, versus having housing on the outskirts of the metro area. These economic impacts assume the absorption of this housing into the housing inventory will be easily accommodated.

⁴ *The Exponent Telegram*, March 30, 2014. Available from http://www.theet.com/news/local/e-gordon-gee-discusses-wvu-its-role-its-future/article_19079ff0-b7b7-11e3-a41c-0019bb2963f4.html.

Appendix A: Economic Impact Definitions

Employment:	The number of jobs in a business, industry, or region. Also, the number of jobs attributable to an impact (see below). This is a measure of the number of full-time and part-time positions, not necessarily the number of employed persons. Jobs are annual average by place of work. A job year is equivalent to one job for one year.
Employee Compensation:	Wages and salaries plus employers' contribution for social insurance (social security, unemployment insurance, workers compensation, etc.) and other labor income (pension contributions, health benefits, etc.). By place of work unless otherwise stated.
Impacts:	The results of the recirculation of funds throughout a regional economy due to the activity of a business, industry, or institution. Estimated by tracing back the flow of money through the initial businesses' employees and suppliers, the businesses selling to the employees and suppliers, and so on. Thus, they are a way to examine the distribution of industries and resources covered in the costs of the initial activity.
Output:	For most sectors, measured as sales plus net inventories and the value of intra-corporate shipments. For retail and wholesale trade, measured as gross margins (i.e. sales minus cost of goods sold, also equal to the mark-up on goods sold).
Value Added:	A measure of the value created by a business or industry or attributable to an impact (see above). Equal to the value of production minus the cost of purchased goods and services. Also equal to employee compensation plus capital income (profits, interest paid, depreciation charges), and indirect business taxes (e.g. severance, excise). Corresponds to the aggregate concepts of gross domestic product (GDP).

Appendix B: Author Biography

The author of this report, Tom S. Witt, Ph.D. is the managing director and chief economist, Witt Economics LLC. Prior to this position, Dr. Witt was professor of economics and director, Bureau of Business and Economic Research, West Virginia University, from which he retired in 2012, completing 42 years of service to West Virginia University. The author of numerous research articles and monographs, he also was the principal or co-investigator on over \$6 million in sponsored research at WVU. He has served as a consultant to West Virginia state agencies including the Legislature, Governor's Office, Department of Education, Division of Highways, and Department of Revenue, among others. He has also served as a consultant to Charleston Area Medical Center, Columbia Gas, Advantage Valley, Braskem, West Virginia Wesleyan College, West Virginia School of Osteopathic Medicine, and others.

Dr. Witt received his B.A. degree in economics from Oklahoma State University and his MA and Ph.D. in economics from Washington University (St. Louis). He is a member of the American Economics Association and the National Association for Business Economics.