

Appendix A

Table A-1 Variables tested in the SAS Model

Variable	Description	Values
ID1	Intersection ID (Indiana observations begin with 1; Michigan intersections begin with 700. Michigan intersections starting with 800 denote the intersection after it has been changed.)	
ID	Observation ID (Indiana observations begin with 1; Michigan observations begin with 7000)	
Interval	Denotes the half-year interval used (NOTE: These intervals were numbered in this manner to align with the time intervals used for the Indiana data.)	1= First half 2004 2= Second half 2004 3=First half 2005 4=Second half 2005 5=First half 2006 6=Second half 2006 7=First half 2007 8=Second half 2007 9=First half 2008 10=Second half 2008 11=First half 2003 12=Second half 2003
Indiana	Is the intersection located in Indiana?	1 if yes, 0 if no
Michigan	Is the intersection located in Michigan?	1 if yes, 0 if no
Const	Is the intersection under construction in the year of the observation?	1 if yes, 0 if no
Freq Mod		
FileID		
Freq Mod	Intersection ID used to link intersection with GIS	
FileIntID		
IntCrhID	Intersection ID used to match with crash data	
IntLong	Longitude of intersection (Indiana only)	
IntLat	Latitude of intersection (Indiana only)	
CountyCd	County code (For Indiana, the county code is as it appears. To distinguish the counties for Indiana and Michigan, 7000 has been added to the county code.)	
NumLegs	Number of legs	3, 4, or 5
MedWidth	Width of the median in feet	(scale)
angle	Intersection angle (degrees)	0 to 90
OneLTB	Does left-turn bay exist in one direction but not the other on the major road?	1 if yes, 0 if no
TwoLTB	Does left-turn bay exist in both directions on	1 if yes, 0 if no

Variable	Description	Values
	the major road?	
OneRTB	Does right-turn bay exist in one direction but not the other on the major road?	1 if yes, 0 if no
TwoRTB	Does right-turn bay exist in both directions on the major road?	1 if yes, 0 if no
OneUTC	Does a U-turn crossover exist in one direction but not the other on the major road?	1 if yes, 0 if no
TwoUTC	Does a U-turn crossover exist in both directions on the major road?	1 if yes, 0 if no
OneLTacl	Does left-turn parallel acceleration lane exist in one direction but not the other on the major road?	1 if yes, 0 if no
TwoLTacl	Does left-turn parallel acceleration lane exist in both directions on the major road?	1 if yes, 0 if no
OneRTacl	Does right-turn parallel acceleration lane exist in one direction but not the other on the major road?	1 if yes, 0 if no
TwoRTacl	Does right-turn parallel acceleration lane exist in both directions on the major road?	1 if yes, 0 if no
OneLTtpr	Does left-turn taper acceleration lane exist in one direction but not the other on the major road?	1 if yes, 0 if no
TwoLTtpr	Does left-turn taper acceleration lane exist in both directions on the major road?	1 if yes, 0 if no
OneRTtpr	Does right-turn taper acceleration lane exist in one direction but not the other on the major road?	1 if yes, 0 if no
OneMajLT	Is one (and only one) of the left-turn movements from the major road permitted at the main intersection?	1 if yes, 0 if no
TwoMajLT	Are both of the left-turn movements from the major road permitted at the major intersection?	1 if yes, 0 if no
OneMinLT	Is one (and only one) of the left-turn movements from the minor road (onto the major road) permitted at the main intersection?	1 if yes, 0 if no
TwoMinLT	Are both of the left turns from the minor road (onto the major road) permitted at the main intersection?	1 if yes, 0 if no
CrosThru	Are the through movements from the minor road permitted to directly cross the major road at the main intersection? (This value will be 0 if no through movements exist,	1 if yes, 0 if no

Variable	Description	Values
	such as at a 3-leg intersection)	
TwoRTtpr	Does right-turn taper acceleration lane exist in both directions on the major road?	1 if yes, 0 if no
DrvwyMaj	Number of driveways existing on the major road	
DrvwyMin	Number of driveways existing on the minor road	
MajCvExt	Does horizontal curvature exist on the minor road?	1 if yes, 0 if no
MjOneCrv	Is there only one curve on the major road near the intersection (within 1600 ft)?	1 if yes, 0 if no
MjTwoCrv	Are there two curves on the major road near the intersection (within 1600 ft)?	1 if yes, 0 if no
IntINerv	Is the intersection located on a horizontal curve on the major road?	1 if yes, 0 if no
MjCvRev	If there are two curves, are they reverse curves (i.e. left then right)?	1 if yes, 0 if no
MjSharpD	Degree of sharpest curve on major road near intersection	
MjSharpR	Radius of sharpest curve on major road near intersection	
MinCvExt	Does horizontal curvature exist on the minor road near the intersection?	1 if yes, 0 if no
ResidLU	Are there residential land uses in the intersection area?	1 if yes, 0 if no
CommLU	Are there commercial land uses in the intersection area?	1 if yes, 0 if no
IndustLU	Are there industrial land uses in the intersection area?	1 if yes, 0 if no
SchlChLU	Are there schools or religious land uses in the intersection area?	1 if yes, 0 if no
MinCtyTn	Is there a city or town within 6 miles of the intersection on the minor road?	1 if yes, 0 if no
Populatn	Population of the city or town along the minor roadway. (Mostly taken from Wikipedia, census estimates; 100 was assumed for unincorporated towns; 0 if MinCtyTn=0)	
INDOTrd	Does INDOT have jurisdiction over the minor roadway? (For Michigan intersections, this is 1 if the minor road has MDOT jurisdiction as a US- or M- numbered route)	1 if yes, 0 if no
LocalRd	Do local agencies have jurisdiction over the minor roadway?	1 if yes, 0 if no
Int3lgmn	Are there 3-leg frontage road intersections	1 if yes, 0 if no

Variable	Description	Values
	with the minor road near the intersection?	
Int4lgmn	Are there 4-leg frontage road intersections with the minor road near the intersection?	1 if yes, 0 if no
RXRmaj	Is there an at-grade railroad crossing near the intersection on the major road?	1 if yes, 0 if no
RXRmin	Is there an at-grade railroad crossing near the intersection on the minor road?	1 if yes, 0 if no
Flashers	Do overhead flashers exist in the intersection area?	1 if yes, 0 if no
MJadt04	AADT for the year 2004 on major rd	
MJadt05	AADT for the year 2005 on major rd	
MJadt06	AADT for the year 2006 on major rd	
MJadt07	AADT for the year 2007 on major rd	
AvgAADT	Average AADT over the four years	
OneGuide	Are there guide signs on one approach, but not the other, on the major road?	1 if yes, 0 if no
TwoGuide	Are there guide signs on both approaches on the major road?	1 if yes, 0 if no
OneLarge	Are there large guide signs on one approach, but not the other, on the major road?	1 if yes, 0 if no
TwoLarge	Are there large guide signs on both approaches on the major road?	1 if yes, 0 if no
OneRtSgn	Are there route shield signs on one approach, but not the other, on the major road?	1 if yes, 0 if no
TwoRtSgn	Are there route shield signs on both approaches on the major road?	1 if yes, 0 if no
OneOverh	Are there overhead signs of any type on one approach, but not the other, on the major road?	1 if yes, 0 if no
TwoOverh	Are there overhead signs of any type on both approaches on the major road?	1 if yes, 0 if no
OneWarn	Are there yellow warning signs on one approach, but not the other, on the major road?	1 if yes, 0 if no
TwoWarn	Are there yellow warning signs on both approaches on the major road?	1 if yes, 0 if no
OneStpDf	Is there a deficiency in the driver's ability to see the intersection, in one direction but not the other, based on the stopping sight distance?	1 if yes, 0 if no
TwoStpDf	Is there a deficiency in the driver's ability to see the intersection, in both directions, based on the stopping sight distance?	1 if yes, 0 if no
One102df	Is there a deficiency in the driver's ability to see the intersection, in one direction but not	1 if yes, 0 if no

Variable	Description	Values
	the other, based on the AASHTO (2004) decision distance at 10.2 ft/s perception/reaction time?	
Two102df	Is there a deficiency in the driver's ability to see the intersection, in both directions, , based on the AASHTO (2004) decision distance at 10.2 ft/s perception/reaction time?	1 if yes, 0 if no
One112df	Is there a deficiency in the driver's ability to see the intersection, in one direction but not the other, based on the AASHTO (2004) decision distance at 11.2 ft/s perception/reaction time?	1 if yes, 0 if no
Two112df	Is there a deficiency in the driver's ability to see the intersection, in both directions, , based on the AASHTO (2004) decision distance at 11.2 ft/s perception/reaction time?	1 if yes, 0 if no
Grades	Are there uphill or downhill grades on any intersection approach?	1 if yes, 0 if no
Crest	Are there any crest vertical curves on any intersection approach?	1 if yes, 0 if no
Sag	Are there any crest vertical curves on any intersection approach?	1 if yes, 0 if no
Speed	Current speed limit in MPH	
NumVehcs	Number of vehicles involved	
MedGT34	Is the median at least 34 feet wide?	1 if yes, 0 if no
MedGT44	Is the median at least 44 feet wide?	1 if yes, 0 if no
MedGT59	Is the median at least 59 feet wide?	1 if yes, 0 if no
One05sDf	Is there a deficiency in the driver's ability to see the intersection, in one direction but not the other, based on 0.5 * the stopping sight distance?	1 if yes, 0 if no
One08sDf	Is there a deficiency in the driver's ability to see the intersection, in one direction but not the other, based on 0.8 * the stopping sight distance?	1 if yes, 0 if no
One12sDf	Is there a deficiency in the driver's ability to see the intersection, in one direction but not the other, based on 1.2 * the stopping sight distance?	1 if yes, 0 if no
One15sDf	Is there a deficiency in the driver's ability to see the intersection, in one direction but not the other, based on 1.5 * the stopping sight distance?	1 if yes, 0 if no

Variable	Description	Values
Two05sDf	Is there a deficiency in the driver's ability to see the intersection, in both directions, based on 0.5 * the stopping sight distance?	1 if yes, 0 if no
Two08sDf	Is there a deficiency in the driver's ability to see the intersection, in both directions, based on 0.8 * the stopping sight distance?	1 if yes, 0 if no
Two12sDf	Is there a deficiency in the driver's ability to see the intersection, in both directions, based on 1.2 * the stopping sight distance?	1 if yes, 0 if no
Two15sDf	Is there a deficiency in the driver's ability to see the intersection, in both directions, based on 1.5 * the stopping sight distance?	1 if yes, 0 if no
KAcrr	Number of fatal or incapacitating injury (KA) crashes in the observation	
BCcrr	Number of minor or possible injury (BC) crashes in the observation	
PDocr	Number of noninjury/property damage only (PDO) crashes in the observation	
INT1	Did the crash take place the first half of 2004 (before the speed limit change)?	1 if yes, 0 if no
INT2	Did the crash take place the second half of 2004 (before the speed limit change)?	1 if yes, 0 if no
INT3	Did the crash take place the first half of 2005 (before the speed limit change)?	1 if yes, 0 if no
INT4	Did the crash take place the second half of 2005 (after the speed limit change)?	1 if yes, 0 if no
INT5	Did the crash take place the first half of 2006 (after the speed limit change)?	1 if yes, 0 if no
INT6	Did the crash take place the second half of 2007 (after the speed limit change)?	1 if yes, 0 if no
INT7	Did the crash take place the first half of 2007 (after the speed limit change)?	1 if yes, 0 if no
INT8	Did the crash take place the second half of 2007 (after the speed limit change)?	1 if yes, 0 if no
AADT	Major road AADT during the year of the crash (scaled—divided by 1,000)	1 if yes, 0 if no
Popul	Population of settlements near intersection area (scaled—divided by 10,000)	1 if yes, 0 if no
lowspeed	During the observation, was the speed limit less than 50 MPH?	1 if yes, 0 if no
MedGT80	Is the median at least 80 ft wide?	1 if yes, 0 if no
MedLT25	Is the median less than 25 feet wide?	1 if yes, 0 if no
Med25a50	Is the median at least 25, but not more than 50, feet wide?	1 if yes, 0 if no
Med50a80	Is the median at least 60, but not more than	1 if yes, 0 if no

Variable	Description	Values
	80, feet side?	
Any05sdf	Is there a deficiency in the driver's ability to see the intersection, in any direction, based on 0.5 * the stopping sight distance?	1 if yes, 0 if no
Any08sdf	Is there a deficiency in the driver's ability to see the intersection, in any direction, based on 0.8 * the stopping sight distance?	1 if yes, 0 if no
AnyStpDf	Is there a deficiency in the driver's ability to see the intersection, in any direction, based on 1.0 * the stopping sight distance?	1 if yes, 0 if no
Any12sdf	Is there a deficiency in the driver's ability to see the intersection, in any direction, based on 1.2 * the stopping sight distance?	1 if yes, 0 if no
Any15sdf	Is there a deficiency in the driver's ability to see the intersection, in any direction, based on 1.5 * the stopping sight distance?	1 if yes, 0 if no
Spd55chg	During the observation, was the speed limit 55 MPH (that later changed to 50 MPH)?	1 if yes, 0 if no
Spd55noc	During the observation, was the speed limit 55 MPH (that DID NOT change to 60 MPH)?	1 if yes, 0 if no
Spd60	During the observation, was the speed limit 60 MPH?	1 if yes, 0 if no
ang75a90	Was the intersection angle between 75° and 90°?	1 if yes, 0 if no
ang60a75	Was the intersection angle between 60° and 75°?	1 if yes, 0 if no
ang45a60	Was the intersection angle between 45° and 60°?	1 if yes, 0 if no
angLT45	Was the intersection angle less than 45°?	1 if yes, 0 if no
angLT60	Was the intersection angle at least 60°?	1 if yes, 0 if no
tee	Is the intersection a 3-leg (T) intersection?	1 if yes, 0 if no
int45678	Did the crash occur after the July 1, 2005 increase in the speed limit?	1 if yes, 0 if no
District	INDOT districts and MDOT regions	INDOT: 1=Crawfordsville 2=Fort Wayne 3=Greenfield 4=LaPorte 5=Seymour 6=Vincennes MDOT: 71=Bay 72=Grand 73=Metro

Variable	Description	Values
		74=North (lower pen.) 75=Southwest 76=University 77=Superior (covers the entire Upper Peninsula)
CVILLE	Is the intersection in the Crawfordsville District?	1 if yes, 0 if no
FTWAYNE	Is the intersection in the Fort Wayne District?	1 if yes, 0 if no
GREENFLD	Is the intersection in the Greenfield District?	1 if yes, 0 if no
LAPORTE	Is the intersection in the LaPorte District?	1 if yes, 0 if no
SEYMOUR	Is the intersection in the Seymour District?	1 if yes, 0 if no
VINCENES	Is the intersection in the Vincennes District?	1 if yes, 0 if no
BAY	Is the intersection in the MDOT Bay region?	1 if yes, 0 if no
GRAND	Is the intersection in the MDOT Grand region?	1 if yes, 0 if no
METRO	Is the intersection in the MDOT Metro region? (primarily encompassing Metro Detroit)	1 if yes, 0 if no
NORTHLWR	Is the intersection in the MDOT North region? (northern lower peninsula) (This variable is unused because there are no study intersections in the North region)	1 if yes, 0 if no
SOUTHWST	Is the intersection in the MDOT Southwest region?	1 if yes, 0 if no
UNIVRSTY	Is the intersection in the MDOT University region?	1 if yes, 0 if no
UPRPENIN	Is the intersection in Michigan's Upper Peninsula?	1 if yes, 0 if no
US24	Is the intersection on the US-24 corridor?	1 if yes, 0 if no
US30	Is the intersection on the US-30 corridor?	1 if yes, 0 if no
US31	Is the intersection on the US-31 corridor?	1 if yes, 0 if no
US41	Is the intersection on the US-41 corridor?	1 if yes, 0 if no
US50	Is the intersection on the US-50 corridor?	1 if yes, 0 if no
US52	Is the intersection on the US-52 corridor?	1 if yes, 0 if no
SR3	Is the intersection on the SR-3 corridor?	1 if yes, 0 if no
SR37	Is the intersection on the SR-37 corridor?	1 if yes, 0 if no
SR63	Is the intersection on the SR-63 corridor?	1 if yes, 0 if no
Muncie	Is the intersection on the Muncie Bypass?	1 if yes, 0 if no