Section III – Part N Traffic Impact Report and Correspondence

TRAFFIC IMPACTS ADDENDUM

AMSTERDAM VILLAGE
GALLATING COUNTY, MONTANA

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December, 2014

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I. TRAFFIC IMPACTS REPORT

A. Project Background

In 2007 a preliminary traffic impact study was completed as part of a larger Preliminary Plat Application for Via Verde Ranch/Village at Amsterdam. This project eventually received preliminary plat approval. As part of that Preliminary Plat the project received approval from the Montana Department of Transportation (MDT) and Gallatin County for the access as shown on the original site plan.

Figure 1 - Original Site Plan

These access include two to Church Hill Road on the east side of the project and one to Amsterdam Road on the north side of the project. Due to changes in the market the project was put on hold until demand improved. In July of 2014 a new pre-application was submitted. The new application dramatically decreasing the scale of the project. Through the pre-application process CTA discussed the revised project with the County and MDT to identify what if any modifications would be required to amend the original TIS. Both parties offered as the project was reduced in scale and primarily kept the same access points that only a minor addendum would be required showing that an acceptable levels of service would still exist with the new uses.

The original project proposed:

- 50,000 SF retail/commercial
- 36 attached family units
- Senior housing units
- 60 townhome units
- 306 singe family units
- Total ADT of 4465

- PM Peak of 428
- AM Peak of 283

The new project proposes:

- 58 single family homes
- 2 commercial lots*
- Single additional access for commercial lots
- Total ADT of 4880
- PM Peak of 263
- AM Peak of 327

* note the new proposal suggests ITE land use 853 Convenience Market with Gas as one of the commercial uses. This is significant trip generator.

This addendum will quantify the changes in trip generation, evaluate any changes in the propose level of service, and any recommend any required mitigating measures.

B. Study Location and Access

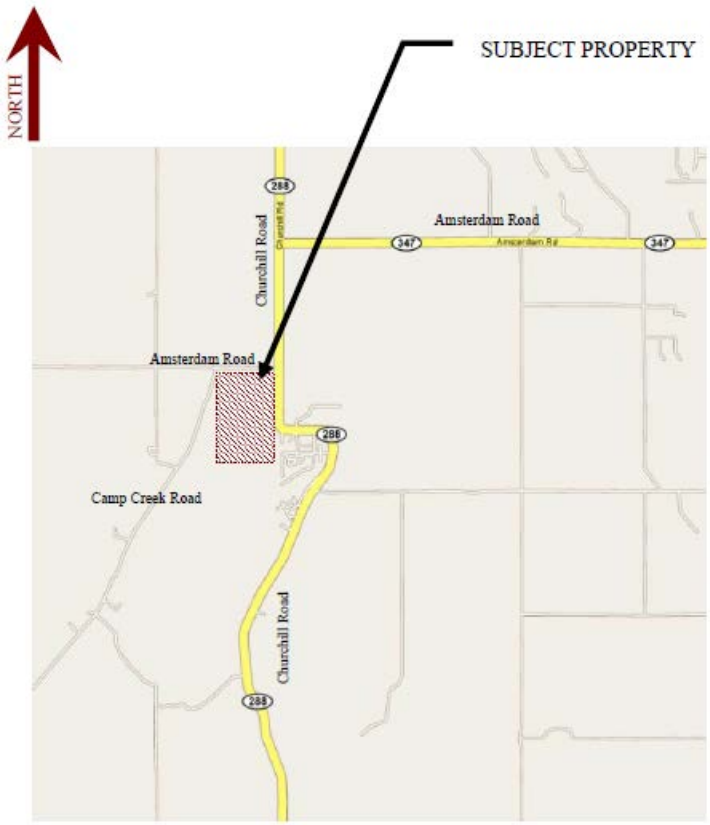


Figure 2- Vicinity Map

The subject property is bounded on the east by Churchill Road, on the west by Camp Creek Road, and on the north by Amsterdam Road, as shown in Figure 2. In this vicinity, Camp Creek Road and Amsterdam Road are two-lane county roads. Churchill Road is a two-lane state highway.

The development proposes one access point onto Amsterdam Road and three access points onto Churchill Road. The Appendix contains a site plan showing the access points described.

C. Development Description and Trip Generation

The Village at Amsterdam proposes 58 single detach housing lots and 2 commercial lots. All single family lots will access the local transportation off new internal local streets while the commercial lots will share and access directly to Churchill Road.

With these land uses and utilizing the *9th Edition of the ITE Trip Generation Manual* peak PM trip generation values are predicted to be:

TRIP GENERATION

	AM Peak Hour of Adjacent Street Traffic			PM Peak Hour of Adjacent Street Traffic		
Use	Enter	Exit	Total	Enter	Exit	Total
210 SF House	11	33	**44**	37	21	**58**
710 General Office	12	2	**14**	2	12	**14**
853 Conv. Market w/Gas	103	102	**205**	128	127	**255**
TOTAL (unajusted)			**263**			**327**

Figure 3- Peak Hour Trip Generation

See **Appendix B** for detailed values. Note no trip reduction factors where used for this analysis.

D. Existing Volumes and Turning Movements

In 2007 turning movements and site specific traffic counts were taken. In reviewing MDT data on ADT in the area traffic has been decreasing since 2011. Provide this it was assumed the existing data from 2007 was still representative of traffic in the area. The data can be viewed at:

http://www.mdt.mt.gov/publications/datastats/traffic_maps.shtml

Additionally given the data no growth factor was applied to the background/existing traffic in the analysis.

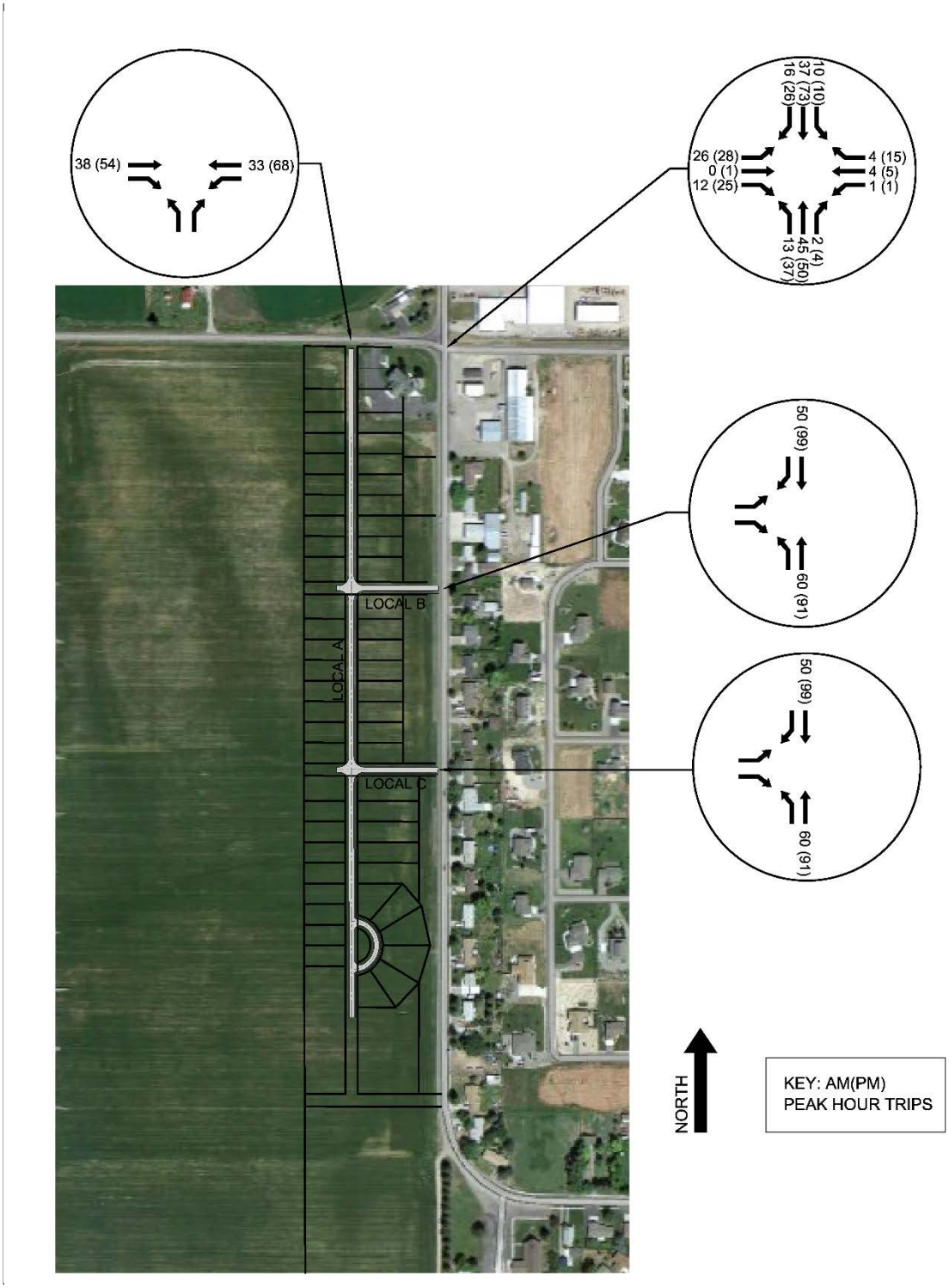


Figure 4 - Existing Turning Movements (2007)

Using the counts provided above and the trip generation values of Section C the

trips where distributed to the following movements in the amounts shown:

TRIP DISTRIBUTION

Street/Intersection	Movement	AM Added Trips	PM Added Trips	Type
Local A & Amsterdam	NBL	1	1	Exit
Local A & Amsterdam	NBR	10	7	Exit
Local A & Amsterdam	EBR	1	1	Enter
Local A & Amsterdam	WBL	3	11	Enter
Church & Amsterdam	SBT	85	96	Enter
Church & Amsterdam	EBR	28	33	Enter
Church & Amsterdam	WBL	2	1	Enter
Church & Amsterdam	NBT	23	57	Exit
Church & Amsterdam	NBR	78	76	Exit
Church & Amsterdam	WBR	3	6	Exit
Local B & Churchill	EBL	7	5	Exit
Local B & Churchill	EBR	2	2	Exit
Local B & Churchill	SBR	3	8	Enter
Local B & Churchill	NBL	1	3	Enter
Local C & Churchill	EBL	8	5	Exit
Local C & Churchill	EBR	4	2	Exit
Local C & Churchill	SBR	3	9	Enter
Local C & Churchill	NBL	1	4	Enter
TOTAL		**263**	**327**	

Note 1 – Values do not include trips from impacting movements. These are however included in Figure 5

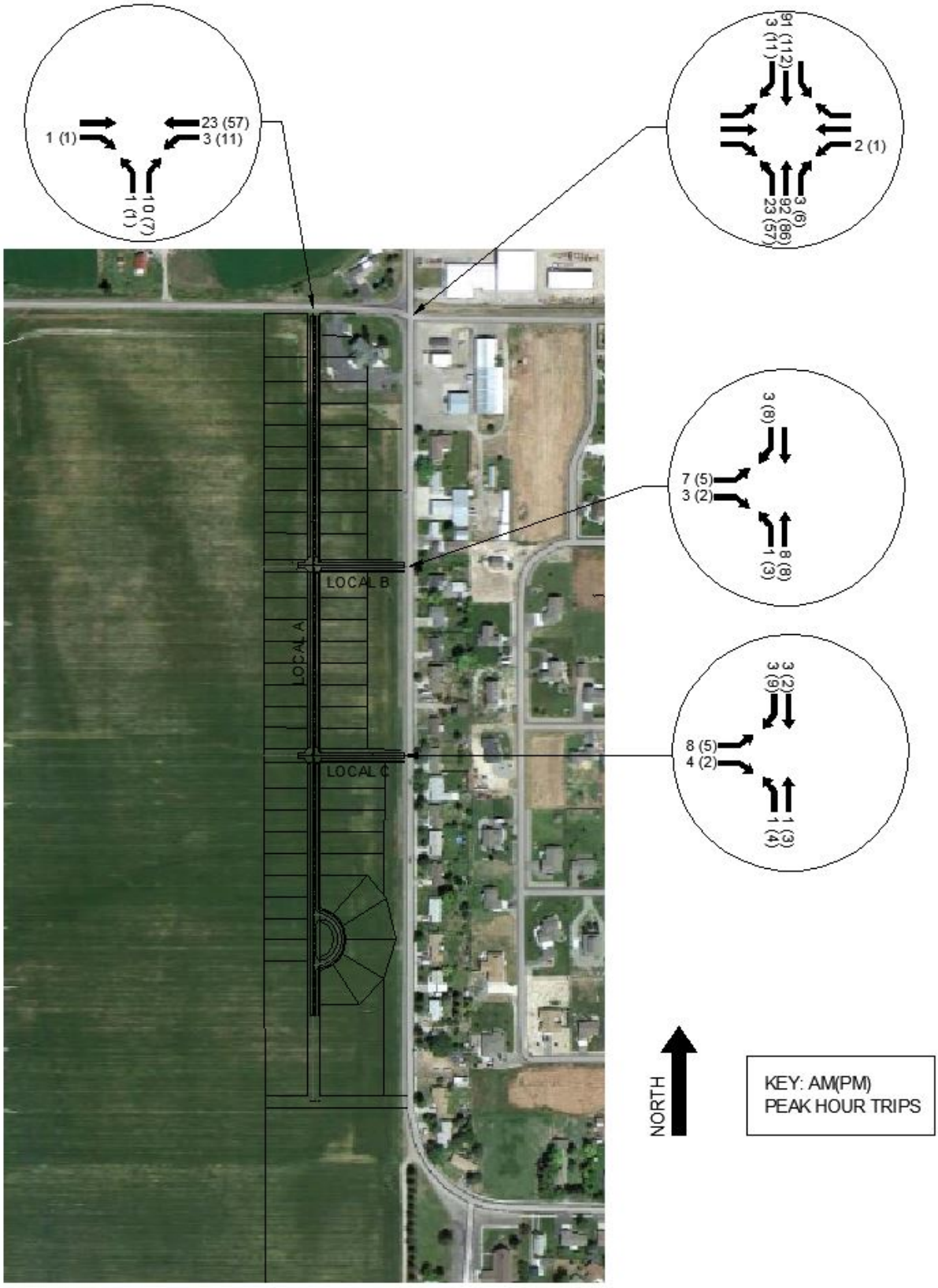


Figure 5 -Trip Assignment

The rational for distribution was based on the following key assumptions:

1. All new local street access points received 1/3 of all exiting and entering land use 210 Single Family trips
2. All new commercial trips where distributed directly to the existing intersection with Church Hill and Amsterdam Roads.
3. Distributions were further refined by considering existing ADT and traffic count volumes to determine an East/West and North/South percentage.
4. Due to configuration no internal capture was assumed, nor were pass-by trip reductions taken.

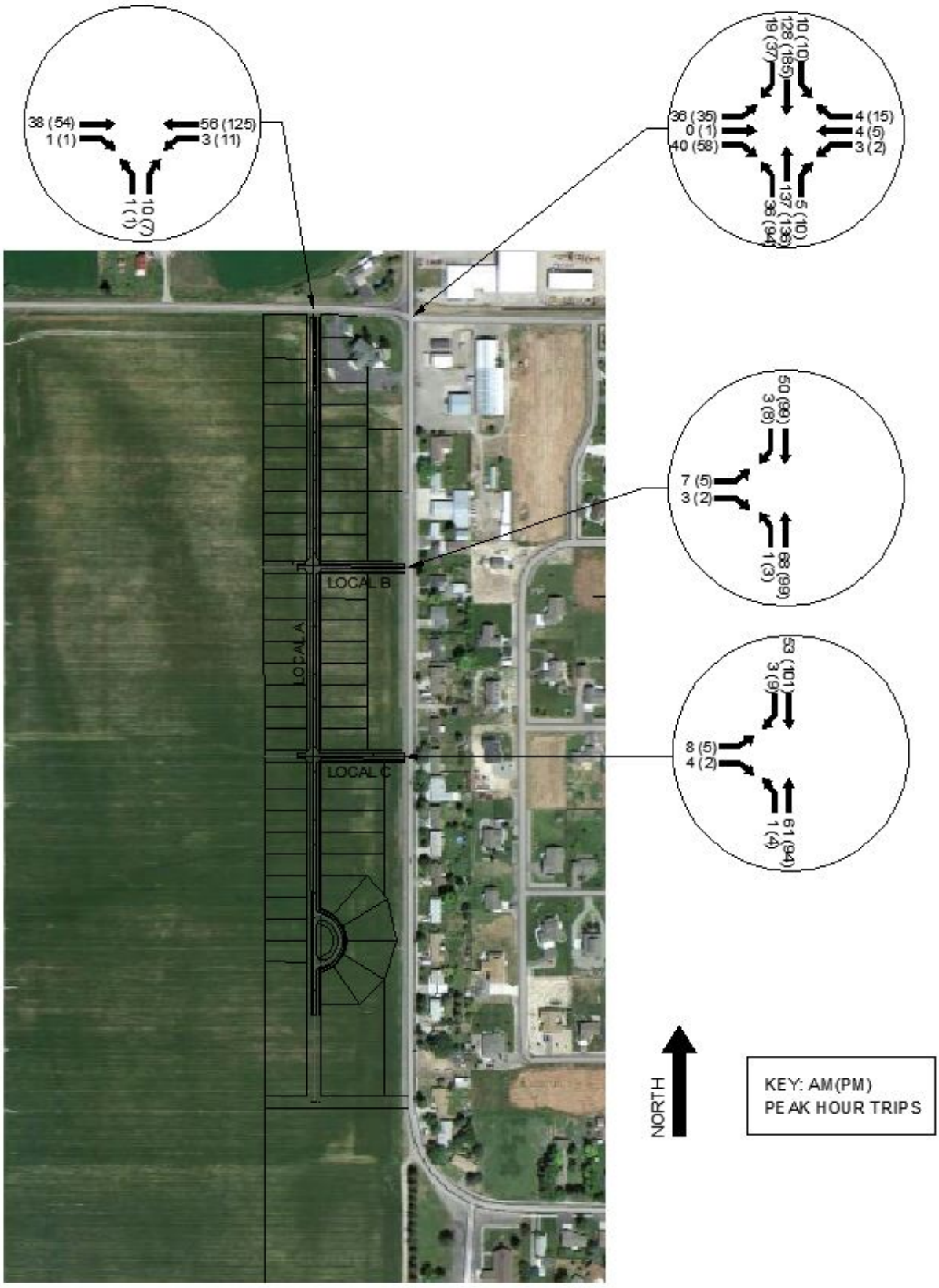


Figure 6 – Future Turning Movements

With the background volumes and the trips distributed a Synchro model was built using the existing road geometry and configuration. Model runs indicated no appreciable drop in level of service and all intersections are predicted to function at Level of Service A.

E. Conclusion and Recommendation

The table below summarizes the delay and LOS results using the calculations provided in the 2010 addition of the Highway Capacity Manual (2010 HCM).

INTERSECTION LOS/DELAY SUMMARY

Intersection	Proposed AM LOS	Proposed Delay	Proposed PM LOS	Proposed Delay
Local A & Amsterdam Rd	A	7.2	A	7.7
Local B & Churchill Rd	A	8.5	A	9.5
Local C & Churchill Rd	A	7.3	A	7.6
Amsterdam Rd & Churchill	A	7.3	A	7.6

The predicted delay does not indicate a change in the current LOS from the predevelopment condition.

At this time CTA is:

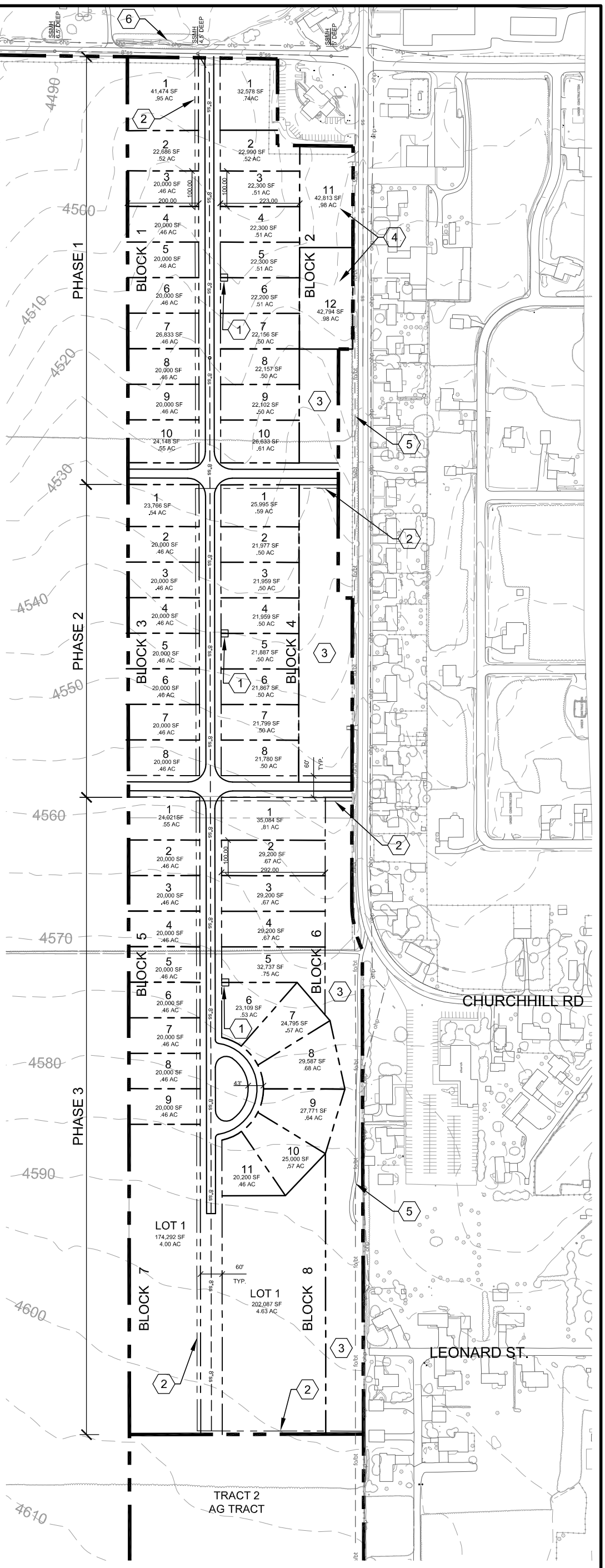
1. **Not recommending** any improvements to lane geometry or configuration to improve LOS or limit delay due to the proposed project.

APPENDIX

Site Layout

LOS Calculations

Trip Generation Values



ACREAGE:

LOTS	= 40.442	
ROADS	= 7.513	
PARK SPACE	= 7.12	(PROVIDED)
TOTAL	=55.075 ac	

LOTS LESS THAN OR
EQUAL TO ½ ac = 24.08 ac

1. FIRE WATER PROTECTION TANK (30,000 GAL.) & HYDRANT
2. 10' UTILITY EASEMENT FOR COMMON TRENCH, ELECTIC, GAS, & COMM.
3. PARK DEDICATION.
   11% OF AREA FOR ALL LOTS LESS THAN OR EQUAL TO ½ ACRE. (2.65 ac)
   ACTUAL = 7.12 ac
4. COMMERCIAL LOTS
5. FIBER OPTIC-AT&T/TELEPHONE- US WEST
6. VALLEY DITCH

GRAPHIC SCALE

300 0 150 300 600

(IN FEET)

1 inch = 300 ft.

VILLAGE AT AMSTERDAM - 60 LOT SUBDIVISION

EXHIBIT B - SUBDIVISION LAYOUT

GALLATIN COUNTY, MONTANA

SHEET# EXH - B

REF SHEET#

ADDENDUM

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BOZEMAN, MT
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Drawn By KA
Checked By RG
Date 5/29/2014
CTA # PROMO_VLGAMST
Cad File: VLAM App-Exhibits

Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Vol, veh/h	0	38	1	0	3	56	0	1	10
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	41	1	0	3	61	0	1	11
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.2	7.3	6.7
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	9%	0%	5%
Vol Thru, %	0%	97%	95%
Vol Right, %	91%	3%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	11	39	59
LT Vol	0	38	56
Through Vol	10	1	0
RT Vol	1	0	3
Lane Flow Rate	12	42	64
Geometry Grp	1	1	1
Degree of Util (X)	0.012	0.047	0.071
Departure Headway (Hd)	3.59	3.988	3.998
Convergence, Y/N	Yes	Yes	Yes
Cap	991	900	899
Service Time	1.634	2.002	2.007
HCM Lane V/C Ratio	0.012	0.047	0.071
HCM Control Delay	6.7	7.2	7.3
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0	0.1	0.2

Intersection	
Intersection Delay, s/veh	8.5
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	36	0	40	0	3	4	4	0	36	137	5
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	39	0	43	0	3	4	4	0	39	149	5
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.1	7.8	8.7
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	20%	47%	27%	6%
Vol Thru, %	77%	0%	36%	82%
Vol Right, %	3%	53%	36%	12%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	178	76	11	157
LT Vol	137	0	4	128
Through Vol	5	40	4	19
RT Vol	36	36	3	10
Lane Flow Rate	193	83	12	171
Geometry Grp	1	1	1	1
Degree of Util (X)	0.234	0.104	0.016	0.204
Departure Headway (Hd)	4.358	4.535	4.683	4.301
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	826	791	765	836
Service Time	2.373	2.554	2.706	2.315
HCM Lane V/C Ratio	0.234	0.105	0.016	0.205
HCM Control Delay	8.7	8.1	7.8	8.4
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.9	0.3	0	0.8

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	10	128	19
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	11	139	21
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	8.4
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	0
Intersection LOS	-

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Vol, veh/h	0	0	0	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	0	0	0
Number of Lanes	0	1	0	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	0	0	0
HCM LOS	-	-	-

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	0%	0%
Vol Thru, %	100%	100%	100%
Vol Right, %	0%	0%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	0	0	0
LT Vol	0	0	0
Through Vol	0	0	0
RT Vol	0	0	0
Lane Flow Rate	0	0	0
Geometry Grp	1	1	1
Degree of Util (X)	0	0	0
Departure Headway (Hd)	3.934	3.934	3.934
Convergence, Y/N	Yes	Yes	Yes
Cap	0	0	0
Service Time	1.934	1.934	1.934
HCM Lane V/C Ratio	0	0	0
HCM Control Delay	6.9	6.9	6.9
HCM Lane LOS	N	N	N
HCM 95th-tile Q	0	0	0

Intersection	
Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Vol, veh/h	0	7	3	0	1	68	0	50	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	8	3	0	1	74	0	54	3
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.2	7.4	7.3
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	1%	70%	0%
Vol Thru, %	99%	0%	94%
Vol Right, %	0%	30%	6%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	69	10	53
LT Vol	68	0	50
Through Vol	0	3	3
RT Vol	1	7	0
Lane Flow Rate	75	11	58
Geometry Grp	1	1	1
Degree of Util (X)	0.083	0.012	0.064
Departure Headway (Hd)	3.999	4.122	3.976
Convergence, Y/N	Yes	Yes	Yes
Cap	898	862	903
Service Time	2.014	2.177	1.993
HCM Lane V/C Ratio	0.084	0.013	0.064
HCM Control Delay	7.4	7.2	7.3
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.3	0	0.2

Intersection	
Intersection Delay, s/veh	0
Intersection LOS	-

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Vol, veh/h	0	0	0	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	0	0	0
Number of Lanes	0	1	0	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	0	0	0
HCM LOS	-	-	-

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	0%	0%
Vol Thru, %	100%	100%	100%
Vol Right, %	0%	0%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	0	0	0
LT Vol	0	0	0
Through Vol	0	0	0
RT Vol	0	0	0
Lane Flow Rate	0	0	0
Geometry Grp	1	1	1
Degree of Util (X)	0	0	0
Departure Headway (Hd)	3.934	3.934	3.934
Convergence, Y/N	Yes	Yes	Yes
Cap	0	0	0
Service Time	1.934	1.934	1.934
HCM Lane V/C Ratio	0	0	0
HCM Control Delay	6.9	6.9	6.9
HCM Lane LOS	N	N	N
HCM 95th-tile Q	0	0	0

Intersection	
Intersection Delay, s/veh	7.3
Intersection LOS	A

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Vol, veh/h	0	8	4	0	1	61	0	53	3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	9	4	0	1	66	0	58	3
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.2	7.3	7.3
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	2%	67%	0%
Vol Thru, %	98%	0%	95%
Vol Right, %	0%	33%	5%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	62	12	56
LT Vol	61	0	53
Through Vol	0	4	3
RT Vol	1	8	0
Lane Flow Rate	67	13	61
Geometry Grp	1	1	1
Degree of Util (X)	0.075	0.015	0.067
Departure Headway (Hd)	4.006	4.088	3.976
Convergence, Y/N	Yes	Yes	Yes
Cap	896	870	902
Service Time	2.023	2.141	1.994
HCM Lane V/C Ratio	0.075	0.015	0.068
HCM Control Delay	7.3	7.2	7.3
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.2	0	0.2

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Movement	EBU	EBT	EBR	WBU	WBL	WBT	NBU	NBL	NBR
Vol, veh/h	0	54	1	0	11	125	0	1	7
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	59	1	0	12	136	0	1	8
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	1	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.4	7.8	6.9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1
Vol Left, %	12%	0%	8%
Vol Thru, %	0%	98%	92%
Vol Right, %	88%	2%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	8	55	136
LT Vol	0	54	125
Through Vol	7	1	0
RT Vol	1	0	11
Lane Flow Rate	9	60	148
Geometry Grp	1	1	1
Degree of Util (X)	0.009	0.067	0.165
Departure Headway (Hd)	3.787	4.048	4.01
Convergence, Y/N	Yes	Yes	Yes
Cap	928	884	897
Service Time	1.878	2.079	2.024
HCM Lane V/C Ratio	0.01	0.068	0.165
HCM Control Delay	6.9	7.4	7.8
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0	0.2	0.6

Intersection	
Intersection Delay, s/veh	9.5
Intersection LOS	A

Movement	EBU	EBL	EBT	EBR	WBU	WBL	WBT	WBR	NBU	NBL	NBT	NBR
Vol, veh/h	0	35	1	58	0	2	5	15	0	94	136	10
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
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	38	1	63	0	2	5	16	0	102	148	11
Number of Lanes	0	0	1	0	0	0	1	0	0	0	1	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	SB
Opposing Lanes	1	1	1
Conflicting Approach Left	SB	NB	EB
Conflicting Lanes Left	1	1	1
Conflicting Approach Right	NB	SB	WB
Conflicting Lanes Right	1	1	1
HCM Control Delay	8.6	8.1	9.9
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	WBLn1	SBLn1
Vol Left, %	39%	37%	9%	4%
Vol Thru, %	57%	1%	23%	80%
Vol Right, %	4%	62%	68%	16%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	240	94	22	232
LT Vol	136	1	5	185
Through Vol	10	58	15	37
RT Vol	94	35	2	10
Lane Flow Rate	261	102	24	252
Geometry Grp	1	1	1	1
Degree of Util (X)	0.331	0.137	0.032	0.311
Departure Headway (Hd)	4.565	4.817	4.837	4.442
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	788	742	736	807
Service Time	2.599	2.861	2.892	2.476
HCM Lane V/C Ratio	0.331	0.137	0.033	0.312
HCM Control Delay	9.9	8.6	8.1	9.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	1.5	0.5	0.1	1.3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Movement	SBU	SBL	SBT	SBR
Vol, veh/h	0	10	185	37
Peak Hour Factor	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2
Mvmt Flow	0	11	201	40
Number of Lanes	0	0	1	0

Approach	SB
Opposing Approach	NB
Opposing Lanes	1
Conflicting Approach Left	WB
Conflicting Lanes Left	1
Conflicting Approach Right	EB
Conflicting Lanes Right	1
HCM Control Delay	9.5
HCM LOS	A

Lane

Intersection	
Intersection Delay, s/veh	0
Intersection LOS	-

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Vol, veh/h	0	0	0	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	0	0	0
Number of Lanes	0	1	0	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	0	0	0
HCM LOS	-	-	-

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	0%	0%
Vol Thru, %	100%	100%	100%
Vol Right, %	0%	0%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	0	0	0
LT Vol	0	0	0
Through Vol	0	0	0
RT Vol	0	0	0
Lane Flow Rate	0	0	0
Geometry Grp	1	1	1
Degree of Util (X)	0	0	0
Departure Headway (Hd)	3.934	3.934	3.934
Convergence, Y/N	Yes	Yes	Yes
Cap	0	0	0
Service Time	1.934	1.934	1.934
HCM Lane V/C Ratio	0	0	0
HCM Control Delay	6.9	6.9	6.9
HCM Lane LOS	N	N	N
HCM 95th-tile Q	0	0	0

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Vol, veh/h	0	5	2	0	3	99	0	99	8
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	5	2	0	3	108	0	108	9
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.4	7.6	7.6
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	3%	71%	0%
Vol Thru, %	97%	0%	93%
Vol Right, %	0%	29%	7%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	102	7	107
LT Vol	99	0	99
Through Vol	0	2	8
RT Vol	3	5	0
Lane Flow Rate	111	8	116
Geometry Grp	1	1	1
Degree of Util (X)	0.124	0.009	0.129
Departure Headway (Hd)	4.04	4.293	3.986
Convergence, Y/N	Yes	Yes	Yes
Cap	887	820	899
Service Time	2.066	2.389	2.011
HCM Lane V/C Ratio	0.125	0.01	0.129
HCM Control Delay	7.6	7.4	7.6
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.4	0	0.4

Intersection	
Intersection Delay, s/veh	0
Intersection LOS	-

Movement	WBU	WBL	WBR	NBU	NBT	NBR	SBU	SBL	SBT
Vol, veh/h	0	0	0	0	0	0	0	0	0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	0	0	0	0	0	0	0	0
Number of Lanes	0	1	0	0	1	0	0	0	1

Approach	WB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	NB		WB
Conflicting Lanes Left	1	0	1
Conflicting Approach Right	SB	WB	
Conflicting Lanes Right	1	1	0
HCM Control Delay	0	0	0
HCM LOS	-	-	-

Lane	NBLn1	WBLn1	SBLn1
Vol Left, %	0%	0%	0%
Vol Thru, %	100%	100%	100%
Vol Right, %	0%	0%	0%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	0	0	0
LT Vol	0	0	0
Through Vol	0	0	0
RT Vol	0	0	0
Lane Flow Rate	0	0	0
Geometry Grp	1	1	1
Degree of Util (X)	0	0	0
Departure Headway (Hd)	3.934	3.934	3.934
Convergence, Y/N	Yes	Yes	Yes
Cap	0	0	0
Service Time	1.934	1.934	1.934
HCM Lane V/C Ratio	0	0	0
HCM Control Delay	6.9	6.9	6.9
HCM Lane LOS	N	N	N
HCM 95th-tile Q	0	0	0

Intersection	
Intersection Delay, s/veh	7.6
Intersection LOS	A

Movement	EBU	EBL	EBR	NBU	NBL	NBT	SBU	SBT	SBR
Vol, veh/h	0	5	2	0	4	94	0	101	9
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	5	2	0	4	102	0	110	10
Number of Lanes	0	1	0	0	0	1	0	1	0

Approach	EB	NB	SB
Opposing Approach		SB	NB
Opposing Lanes	0	1	1
Conflicting Approach Left	SB	EB	
Conflicting Lanes Left	1	1	0
Conflicting Approach Right	NB		EB
Conflicting Lanes Right	1	0	1
HCM Control Delay	7.4	7.6	7.6
HCM LOS	A	A	A

Lane	NBLn1	EBLn1	SBLn1
Vol Left, %	4%	71%	0%
Vol Thru, %	96%	0%	92%
Vol Right, %	0%	29%	8%
Sign Control	Stop	Stop	Stop
Traffic Vol by Lane	98	7	110
LT Vol	94	0	101
Through Vol	0	2	9
RT Vol	4	5	0
Lane Flow Rate	107	8	120
Geometry Grp	1	1	1
Degree of Util (X)	0.12	0.009	0.132
Departure Headway (Hd)	4.045	4.291	3.978
Convergence, Y/N	Yes	Yes	Yes
Cap	886	821	902
Service Time	2.07	2.387	2.003
HCM Lane V/C Ratio	0.121	0.01	0.133
HCM Control Delay	7.6	7.4	7.6
HCM Lane LOS	A	A	A
HCM 95th-tile Q	0.4	0	0.5

Montana Department of Transportation
2701 Prospect Avenue
PO Box 201001
Helena MT 59620-1001

Jim Lynch, Director
Brian Schweitzer, Governor

February 28, 2007

Wayne Freeman
CTA Architects Engineers
Bozeman, MT 59718

Subject: Amsterdam Village Subdivision

Mr. Freeman,

I apologize for the period it's taken for us to comment on this development. MDT staff has reviewed the submitted material and our comments follow.

TIS Comments

Please submit a scaled map of the site that shows any existing approaches on the east side of Churchill Road and the north side of Amsterdam Road. This will allow us to ensure that any existing approaches will not be negatively impacted by this development's access.

Per MDT approach standards, we will generally not permit more than two approach locations to a single property unless trip generation warrants an additional access to lessen the impact to MDT's roadway and the traveling public. With the volumes projected for this development, we do not agree with allowing more than two approach locations. The additional safety issues created by allowing an additional access are not justified by the volumes. If an exceptional conditions exist that would warrant allowing additional approaches, please provide sufficient information for MDT staff to evaluate that justification.

Without strong justification, MDT will consider allowing a single approach to Churchill Road and a single approach to Amsterdam Road. With the consolidation of the access locations, the TIS should identify if turn lanes at these approach locations are warranted.

Hydraulic Comments

Inclusion of a vicinity map with property boundaries in relation to Amsterdam and Churchill Road is required.

From the material provided, it is unclear if the project drains toward the state or county roadway. If toward the county roadway, the county will have to review and approve the drainage plan. If toward MDT's roadway, we will need a drainage plan for review and approval. Please determine the appropriate agency for drainage review.

If MDT is the appropriate agency, we will need to review the final drainage plan. I've attached a list of items we generally require for a drainage plan and will also include the calculation spreadsheet referenced via e-mail. In addition to the attached list, our hydraulics section offered the following comments.

- The maximum flow length for sheet flow on the calculation spreadsheet is 300-feet.
- The final drainage plan should be plotted with contours and flow paths.

As appropriate, please respond to the above comments concerning access to the proposed development and also provide the necessary information for MDT to assess if we need to further review the drainage report.

If you have any questions please don't hesitate to contact me at (406) 444-9233 or let me know during the meeting scheduled on March 12.

Sincerely,

Jim Skinner, Manager
Program & Policy Analysis Section
Rail, Transit & Planning Division

attachment

copies: Jeff Ebert, P.E., Butte District Administrator
Danielle Bolan, P.E., State Traffic Engineer
Rob Bukvich, Bozeman Area Utility Agent