

3667

MEMORANDUM



To: Shawn Kuntz – Traffic Operations Engineer
From: Josh Locgering – Traffic Operations
Date: November 10, 2009
Subject: Turn Lane Request -- ND 23 Corridor

Introduction

This memo is in response to a request from NDDOT management to look at installing right and left turn lanes at the following intersections:

- ND 23 and ND 8
- ND 23 and ND 37
- ND 23 and 64th Ave NW (Plaza)
- ND 23 and Ward Co. #9/338th St SW
- ND 23 and ND 28
- ND 23 and Ward Co. # 13/142nd St SW

These intersections were included in a 2008 Safety Study Analysis for the 2008 HSIP.

The base criterion for a right or left turn lane is as follows:

- *Turn lanes shall be for the uncontrolled legs at two-way stop-controlled intersections.*
- *The major roadway speed limit shall be 50mph or greater*

For a right turn lane to be considered one of the following warrants should be met:

- *Major corridor AADT exceeds 750 vehicles per day and the right turn movement exceeds 50 vehicles per day, or*
- *There have been 3 Rear End crashes in 3yrs, or*
- *A turn lane is recommended based on engineering judgment as part of a Traffic Operations study.*

For a left turn lane to be considered, one of the following warrants should be met:

- *The major corridor AADT exceeds 1500 vehicles per day and the left turn movement exceeds 100 vehicles per day, or*

- *Left turn movements (minimum of 50 left-turning vehicles per day) account for 10% or more of the approach traffic volumes, or*
- *The peak hour left-turn delay exceeds 15 seconds, or*
- *There have been a total of 3 crashes (Rear End + Left Turn) in 3yrs, or*
- *A turn lane is recommended based on engineering judgment as part of a Traffic Operations study.*

Turn Lane Analysis

ND 23 and ND 8

The 2009 Safety Study Analysis recommended reconstructing the westbound right turn lane to meet the current design standards of the NDDOT. At the time of the study, turn lanes or any other safety improvements were not recommended. At the time of the study, current traffic counts were not available.

A traffic volume count was taken on November 2, 2009 and the results can be found in Appendix A page 1. The 20 year projected traffic volume counts can be found in Appendix A page 2.

There were no reported crashes within the study period (August 1, 2006 to July 31, 2009) at this intersection.

The following table indicates the turning movement volumes for each approach of the intersection:

Approach	Volume	Turn Lane Warranted
WB Total	1636	NA
WB Right Turn	338	Existing
WB Left Turn	35	No
EB Total	1895	NA
EB Right Turn	60	Yes
EB Left Turn	572	Yes
NB Total	120	NA
NB Right Turn	35	No
NB Left Turn	60	No
SB Total	935	NA
SB Right Turn	572	No
SB Left Turn	338	No

As indicated by the above table, an EB right turn lane, and an EB left turn lane are warranted.

It is recommended to install an EB right turn lane on ND 23 and an EB left turn lane on ND 23. Both of these turn lanes should be designed according the NDDOT's "Left and Right Turn Lane Criteria for Design of Non-Controlled Intersections".

ND 23 and ND 37

The 2009 Safety Study Analysis recommended reconstructing the eastbound right turn lane to meet the current design standards of the NDDOT. At the time of the study, turn lanes or any other safety improvements were not recommended. At the time of the study, current traffic counts were not available.

A traffic volume count was taken on November 2, 2009 and the results can be found in Appendix A page 3. The 20 year projected traffic volume counts can be found in Appendix A page 4.

There were three reported crashes within the study period (August 1, 2006 to July 31, 2009) at this intersection. All three crashes were angle crashes.

The following table indicates the turning movement volumes for each approach of the intersection:

Approach	Volume	Turn Lane Warranted
WB Total	981	NA
WB Right Turn	26	No
WB Left Turn	363	Yes
EB Total	1425	NA
EB Right Turn	719	Existing
EB Left Turn	114	No
NB Total	1108	NA
NB Right Turn	363	No
NB Left Turn	719	No
SB Total	169	NA
SB Right Turn	114	No
SB Left Turn	26	No

As indicated by the above table a WB left turn lane is warranted.

It is recommended to install a WB left turn lane on ND 23. The turn lane should be designed according to the NDDOT's "Left and Right Turn Lane Criteria for Design of Non-Controlled Intersections".

ND 23 and 64th Ave NW (Plaza)

The Plaza City Council has indicated that due to two new water disposal wells that are located north of the intersection and south of Plaza, there has been a significant increase in traffic turning north off of ND 23.

The 2009 Safety Study Analysis recommended increasing the radius of the northeast quadrant of the intersection. At the time of the study, turn lanes or any other safety improvements were not recommended. At the time of the study, current traffic counts were not available.

Due to the current Plaza City Council request, a traffic volume count was taken on October 29, 2009 and the results can be found in Appendix A on page 5. The 20 year projected traffic volumes can be found in Appendix A on page 6.

There were no reported crashes within the study period (August 1, 2006 –July 31, 2009) at this intersection.

The following table indicates the turning movement volumes for each approach of the intersection:

Approach	Volume	Turn Lane Warranted
WB Total	836	NA
WB Right Turn	88	Yes
WB Left Turn	15	No
EB Total	870	NA
EB Right Turn	17	No
EB Left Turn	120	Yes
NB Total	40	NA
NB Right Turn	15	No
NB Left Turn	17	No
SB Total	216	NA
SB Right Turn	120	No
SB Left Turn	88	No

As indicated by the above table, a WB right turn lane, and an EB left turn lane are warranted.

It is recommended to install a WB right turn lane on ND 23 and an EB left turn lane on ND 23. Both of these turn lanes should be designed according the NDDOT's "Left and Right Turn Lane Criteria for Design of Non-Controlled Intersections".

ND 23 and Ward Co. #9/338th St SW

The 2009 Safety Study Analysis recommended reconstructing the eastbound and westbound right turn lanes to meet the current design standards of the NDDOT. At the time of the study, turn lanes or any other safety improvements were not recommended. At the time of the study, current traffic counts were not available.

A traffic volume count was taken on November 2, 2009 and the results can be found in Appendix A page 7. The 20 year projected traffic volume counts can be found in Appendix A page 8.

There were two reported crashes within the study period (August 1, 2006 to July 31, 2009) at this intersection. All crashes were angle crashes with a SB vehicle running the stop sign.

The following table indicates the turning movement volumes for each approach of the intersection:

Approach	Volume	Turn Lane Warranted
WB Total	627	NA
WB Right Turn	71	Existing
WB Left Turn	56	No
EB Total	838	NA

EB Right Turn	158	Existing
EB Left Turn	180	Yes
NB Total	257	NA
NB Right Turn	56	No
NB Left Turn	158	No
SB Total	294	NA
SB Right Turn	180	No
SB Left Turn	71	No

As indicated by the above table, an EB left turn lane is warranted.

It is recommended to install an EB left turn lane on ND 23. This turn lane should be designed according to the NDDOT's "Left and Right Turn Lane Criteria for Design of Non-Controlled Intersections".

ND 23 and ND 28/254th St SW

The 2009 Safety Study Analysis recommended reconstructing the eastbound and westbound right turn lanes to meet the current design standards of the NDDOT. At the time of the study, turn lanes or any other safety improvements were not recommended. At the time of the study, current traffic counts were not available.

A traffic volume count was taken on November 2, 2009 and the results can be found in Appendix A page 9. The 20 year projected traffic volume counts can be found in Appendix A page 10.

There were no reported crashes within the study period (August 1, 2006 to July 31, 2009) at this intersection.

The following table indicates the turning movement volumes for each approach of the intersection:

Approach	Volume	Turn Lane Warranted
WB Total	618	NA
WB Right Turn	10	No
WB Left Turn	82	Yes
EB Total	615	NA
EB Right Turn	80	Existing
EB Left Turn	9	No
NB Total	164	NA
NB Right Turn	82	No
NB Left Turn	80	No
SB Total	21	NA
SB Right Turn	9	No
SB Left Turn	10	No

As indicated by the above table, a WB left turn is warranted.

It is recommended to install a WB left turn lane on ND 23. The turn lane should be designed according the NDDOT's "Left and Right Turn Lane Criteria for Design of Non-Controlled Intersections".

ND 23 and Ward Co. #13/142nd St SW

The 2009 Safety Study Analysis recommended installing a westbound right turn lane. At the time of the study, other turn lanes or any other safety improvements were not recommended. At the time of the study, current traffic counts were not available.

A traffic volume count was taken on November 2, 2009 and the results can be found in Appendix A page 11. The 20 year projected traffic volume counts can be found in Appendix A page 12.

There were no reported crashes within the study period (August 1, 2006 to July 31, 2009) at this intersection.

The following table indicates the turning movement volumes for each approach of the intersection:

Approach	Volume	Turn Lane Warranted
WB Total	627	NA
WB Right Turn	35	No
WB Left Turn	20	No
EB Total	600	NA
EB Right Turn	8	Existing
EB Left Turn	20	No
NB Total	33	NA
NB Right Turn	20	No
NB Left Turn	8	No
SB Total	60	NA
SB Right Turn	20	No
SB Left Turn	35	No

According to the above table, no turn lanes are warranted at this time.

As stated above, it is recommended to install a westbound right turn lane as study in the 2009 Safety Study Analysis (11/25/08).

Conclusion

It is recommended to install an EB right turn lane on ND 23 and an EB left turn lane on ND 23 at the intersection of ND 23 and ND 8. Both of these turn lanes should be designed according the NDDOT's "Left and Right Turn Lane Criteria for Design of Non-Controlled Intersections".

It is recommended to install a WB left turn lane on ND 23 at the intersection of ND 23 and ND 37. This turn lane should be designed according the NDDOT's "Left and Right Turn Lane Criteria for Design of Non-Controlled Intersections".

It is recommended to install a WB right turn lane on ND 23 and an EB left turn lane on ND 23 at the intersection of ND 23 and 64th Ave NW (Plaza). Both of these turn lanes should be designed according the NDDOT's "Left and Right Turn Lane Criteria for Design of Non-Controlled Intersections".

It is recommended to install an EB left turn lane on ND 23 at the intersection of ND 23 and Ward Co. #9/338th St SW. This turn lane should be designed according the NDDOT's "Left and Right Turn Lane Criteria for Design of Non-Controlled Intersections".

It is recommended to install a WB left turn lane on ND 23 at the intersection of ND 23 and ND 28/254th St SW. The turn lane should be designed according the NDDOT's "Left and Right Turn Lane Criteria for Design of Non-Controlled Intersections".

It is recommended to install a westbound right turn lane at the intersection of ND 23 and Ward Co. #13/142nd St SW. The turn lane should be designed according the NDDOT's "Left and Right Turn Lane Criteria for Design of Non-Controlled Intersections".



Intersection Traffic Volumes

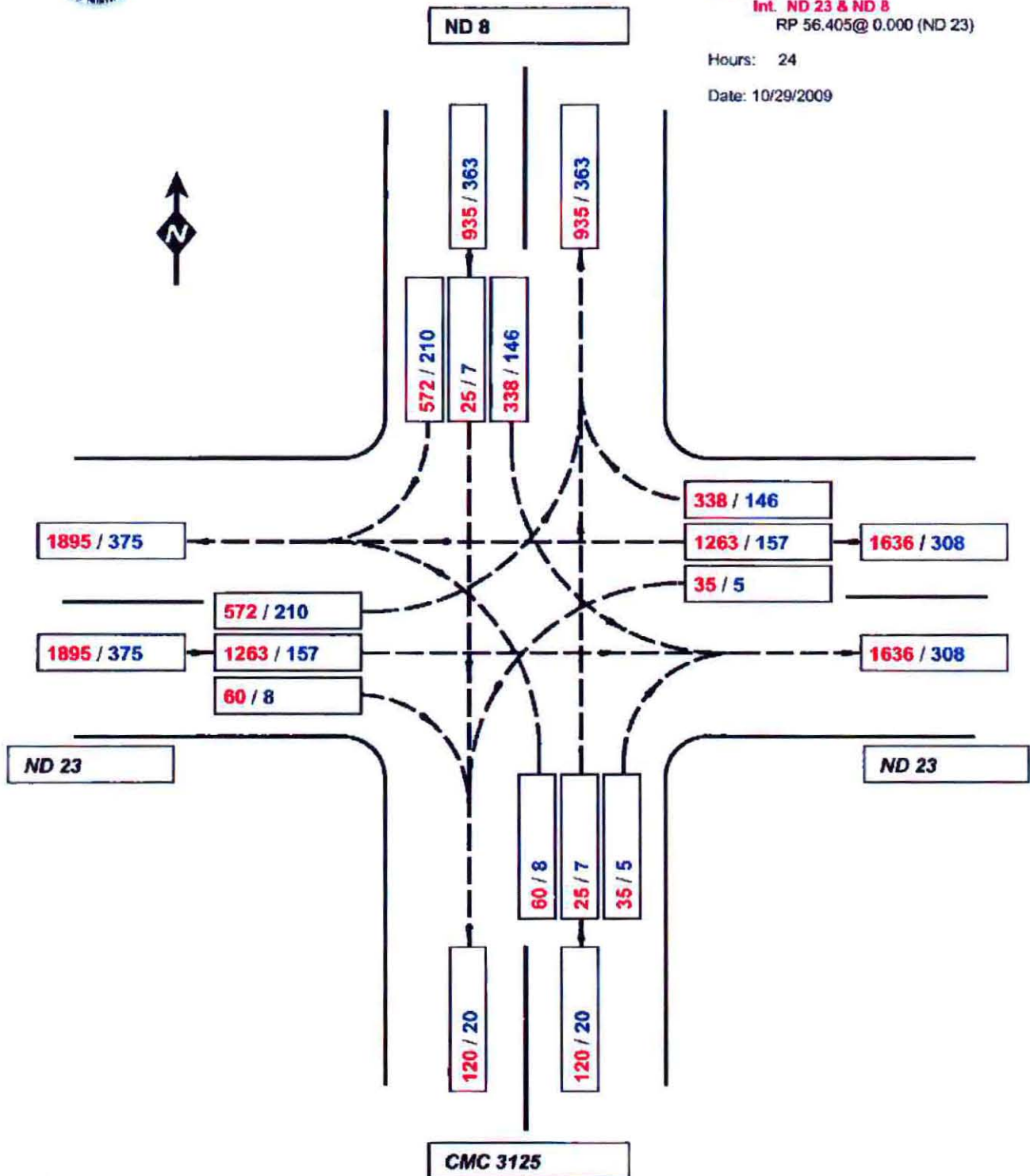
North Dakota Department of Transportation
SFN 7921 (Rev. 4-85)

Intersection No: 5

Description: Mountrail
Int. ND 23 & ND 8
RP 56.405@ 0.000 (ND 23)

Hours: 24

Date: 10/29/2009



LEGEND: AADT / TRUCKS - 2009

Completed by NR



Intersection Traffic Volumes
North Dakota Department of Transportation
SFN 7921 (Rev. 4-85)

Intersection No: 5

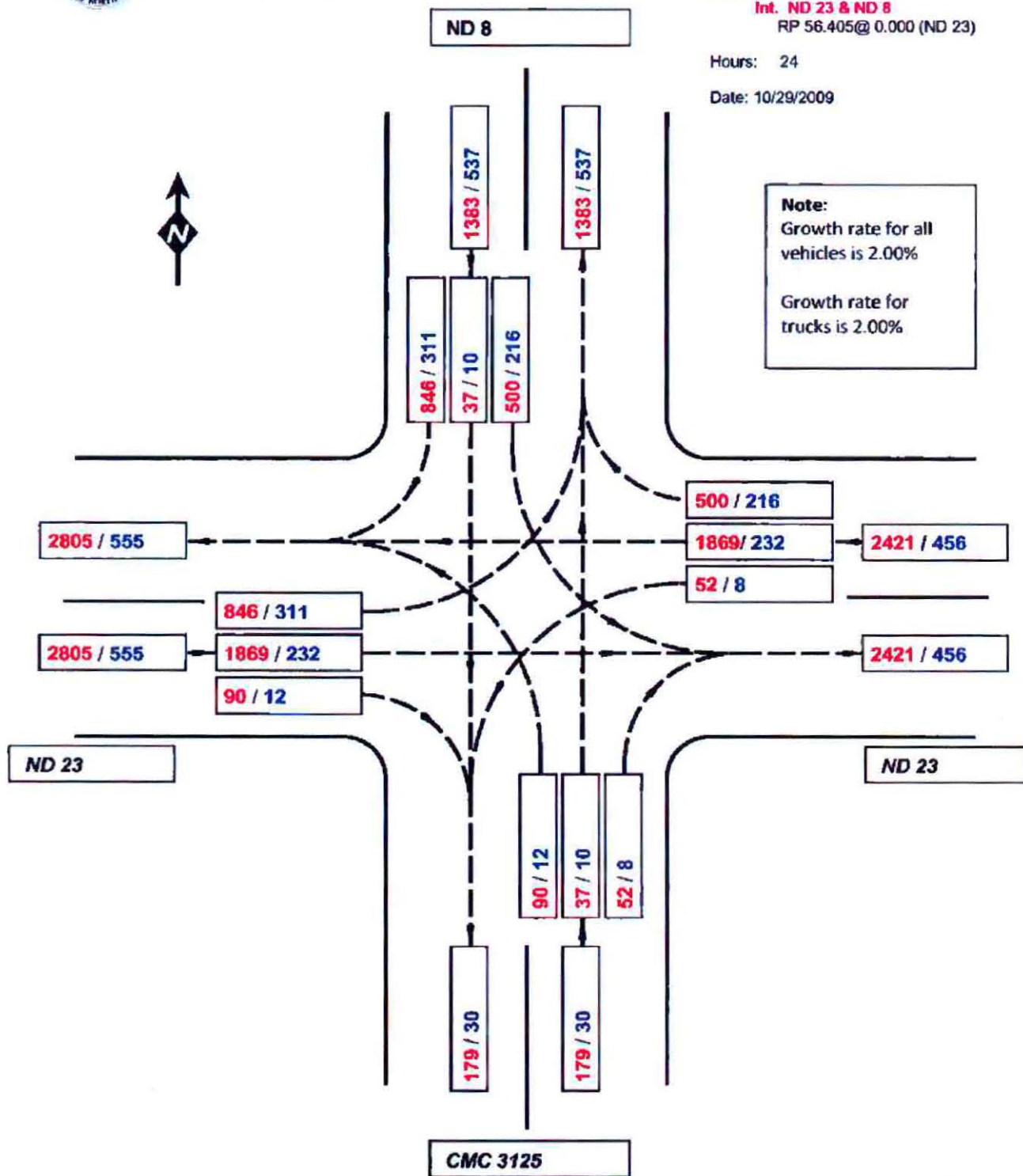
Description: Mountrail
Int. ND 23 & ND 8
RP 56.405@ 0.000 (ND 23)

Hours: 24

Date: 10/29/2009

Note:
Growth rate for all
vehicles is 2.00%

Growth rate for
trucks is 2.00%



LEGEND: AADT / TRUCKS - 2029

Completed by NR



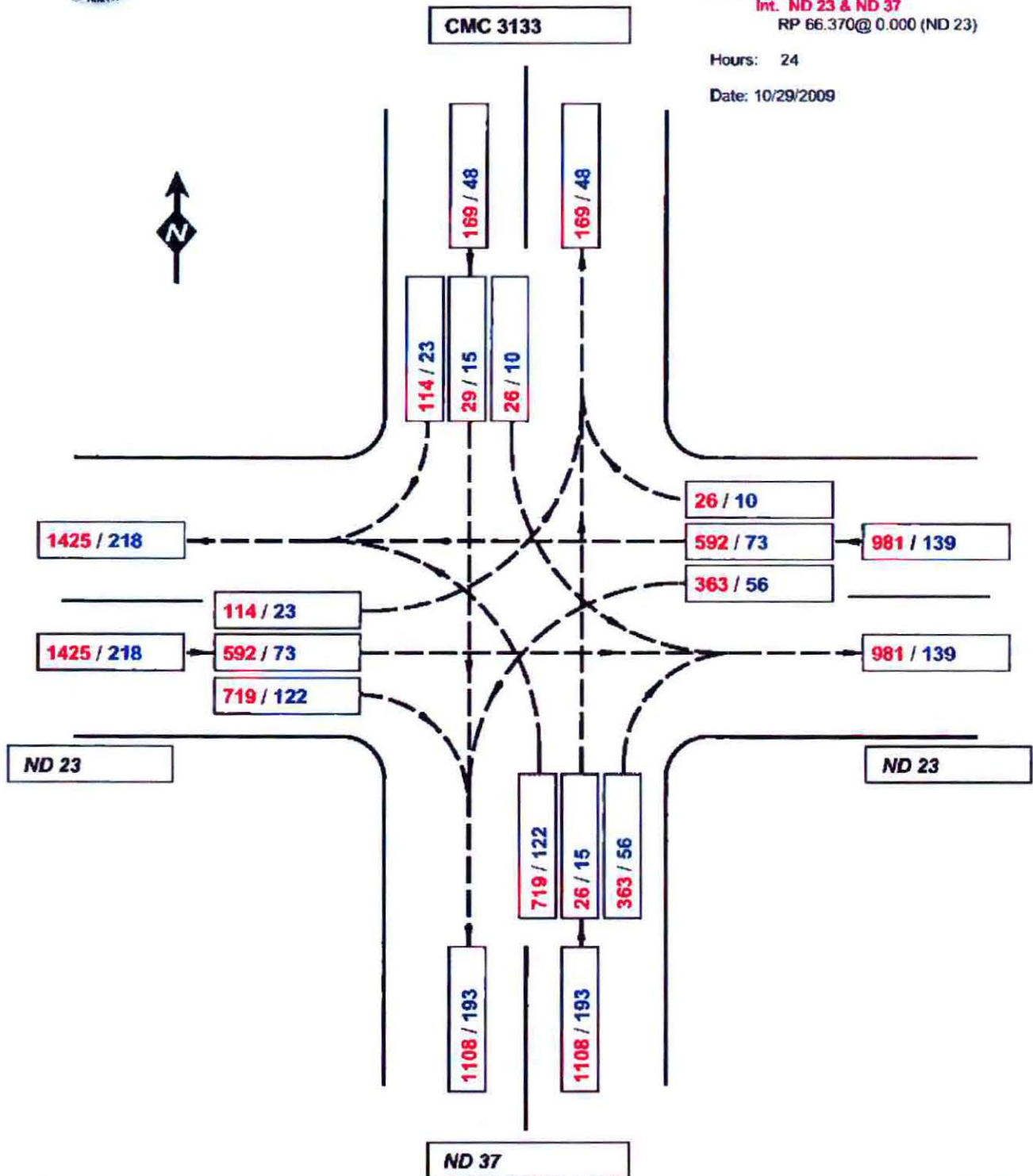
Intersection Traffic Volumes
North Dakota Department of Transportation
SFN 7921 (Rev. 4-85)

Intersection No: 4

Description: Mountrail
Int. ND 23 & ND 37
RP 66.370 @ 0.000 (ND 23)

Hours: 24

Date: 10/29/2009





Intersection Traffic Volumes

North Dakota Department of Transportation
SFN 7921 (Rev. 4-85)

Intersection No: 4

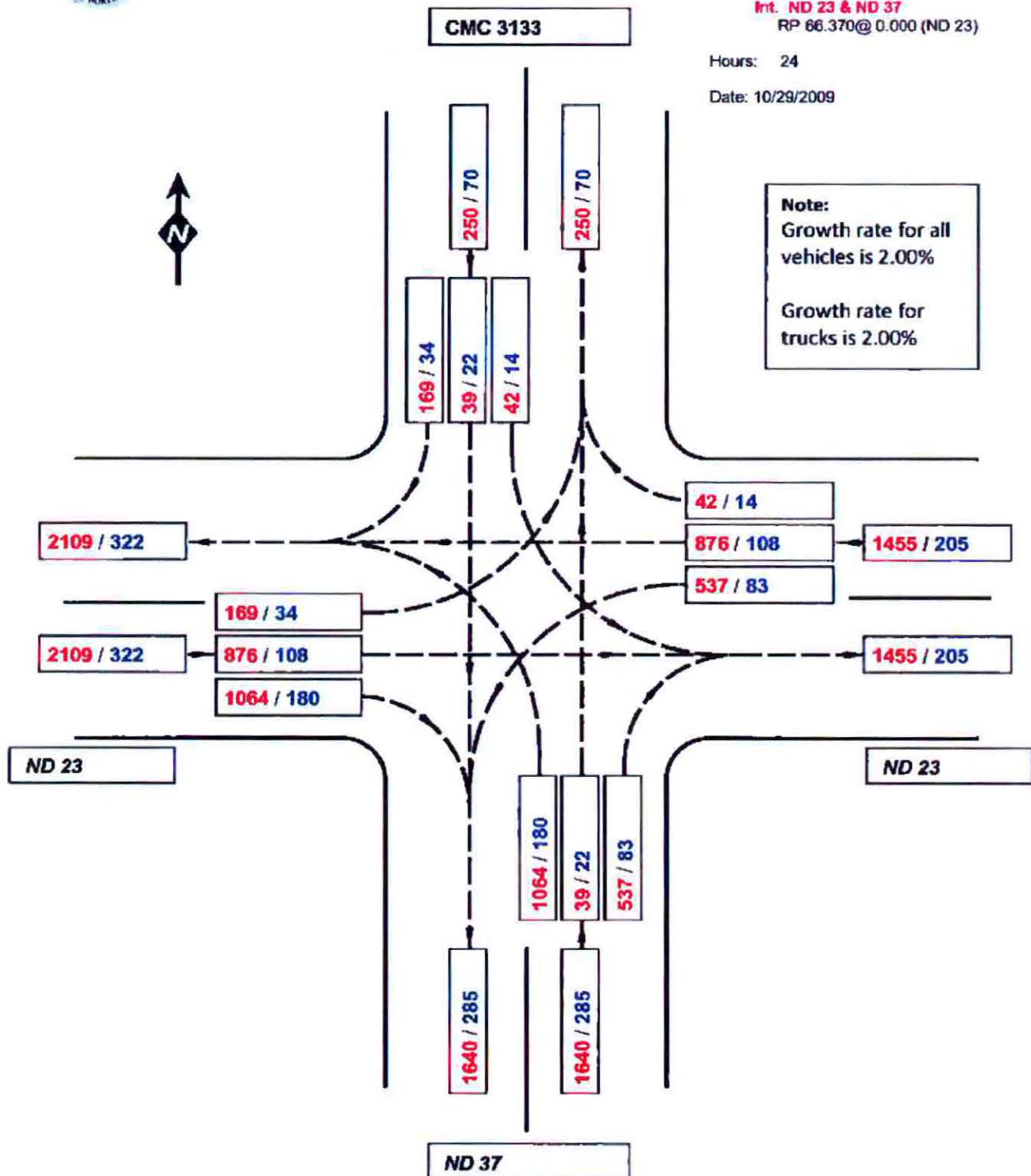
Description: Mountrail

Int. ND 23 & ND 37

RP 66.370 @ 0.000 (ND 23)

Hours: 24

Date: 10/29/2009





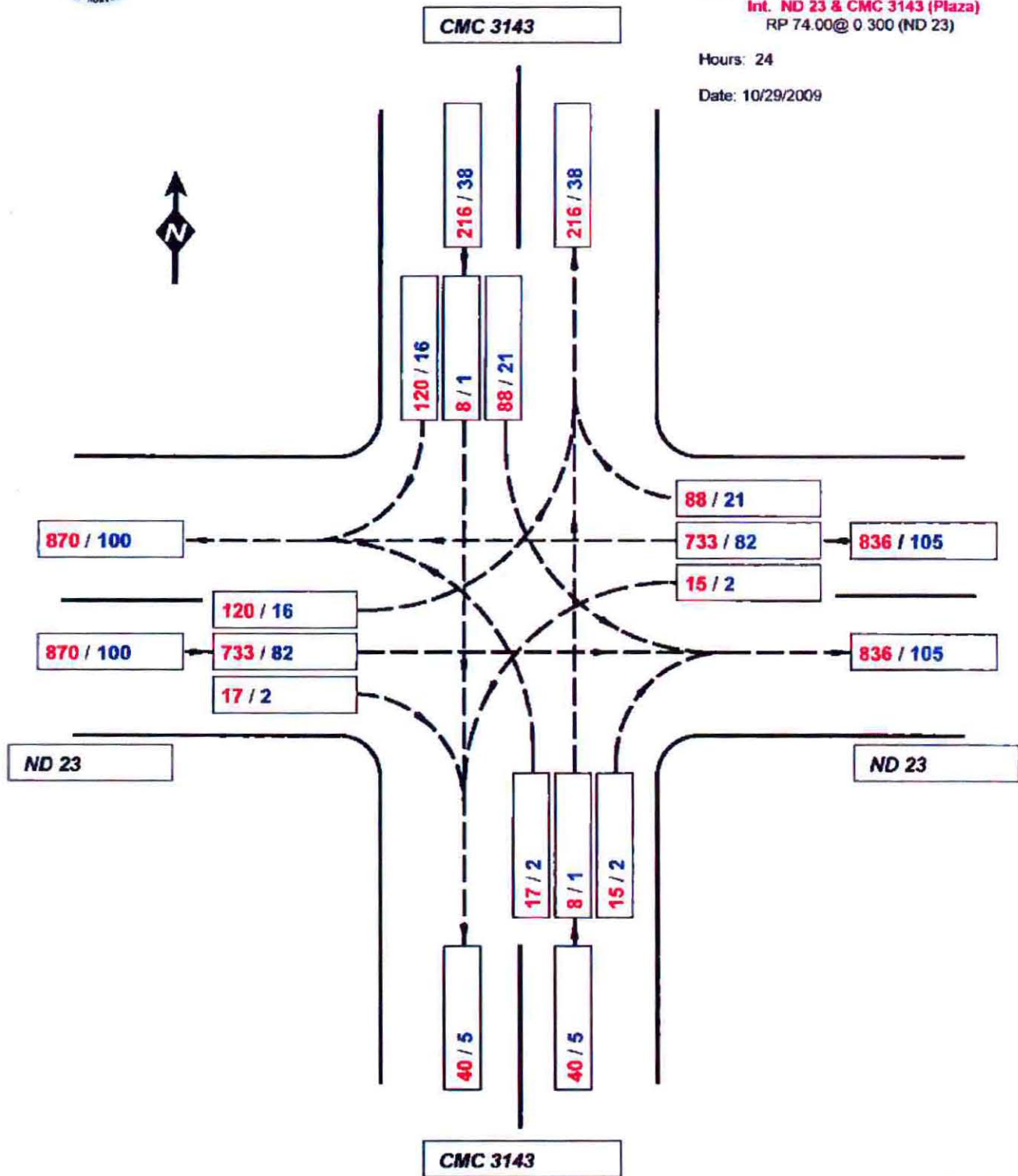
Intersection Traffic Volumes
North Dakota Department of Transportation
SFN 7921 (Rev. 4-85)

Intersection No: 1

Description: Mountrail
Int. ND 23 & CMC 3143 (Plaza)
RP 74.00 @ 0.300 (ND 23)

Hours: 24

Date: 10/29/2009



Completed by NR



Intersection Traffic Volumes
North Dakota Department of Transportation
SFN 7921 (Rev. 4-85)

Intersection No: 1

Description: Mountrail
Int. ND 23 & CMC 3143 (Plaza)
RP 74.00 @ 0.300 (ND 23)

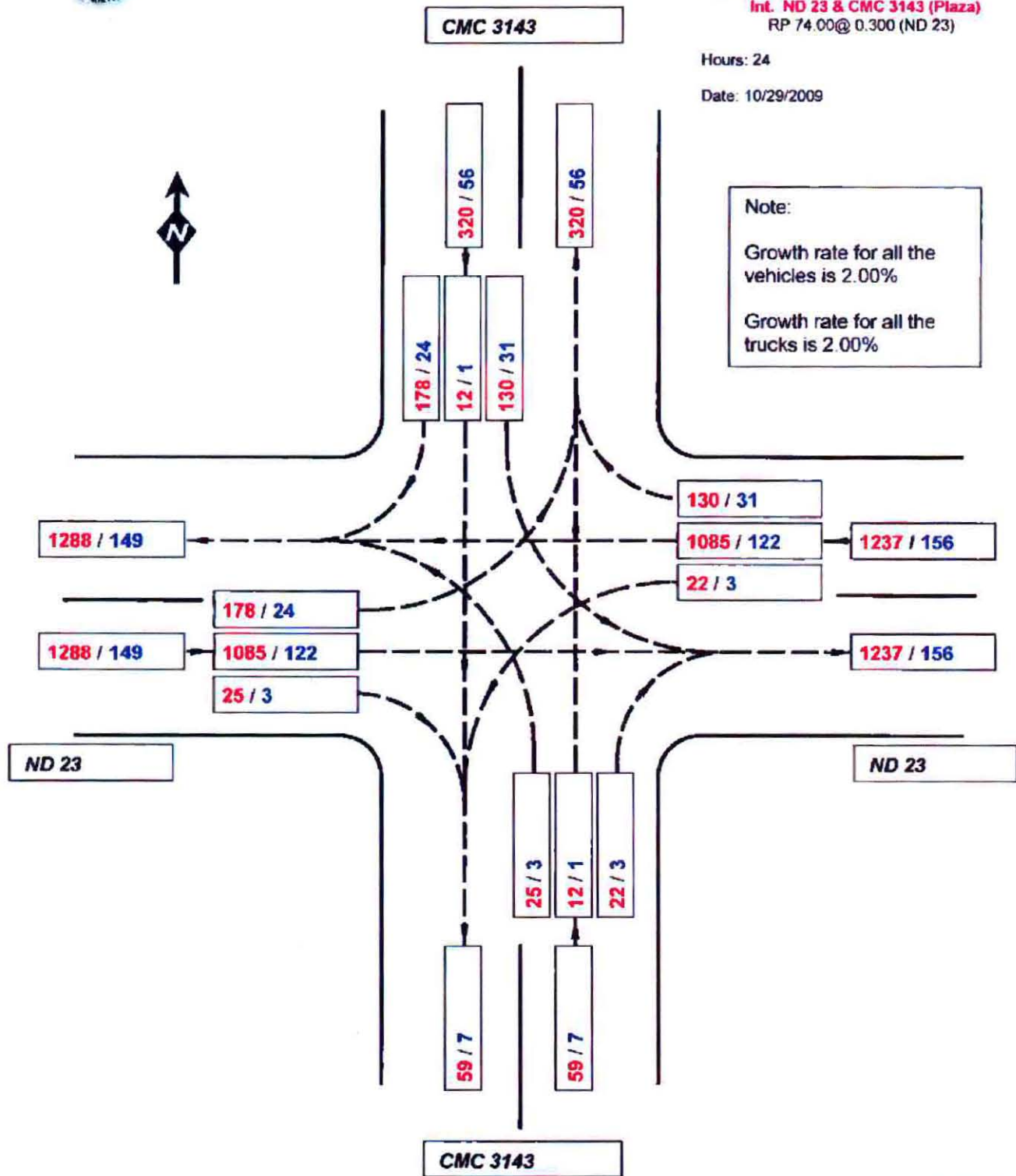
Hours: 24

Date: 10/29/2009

Note:

Growth rate for all the vehicles is 2.00%

Growth rate for all the trucks is 2.00%



LEGEND: **AADT / TRUCKS** - 2029

Completed by NR



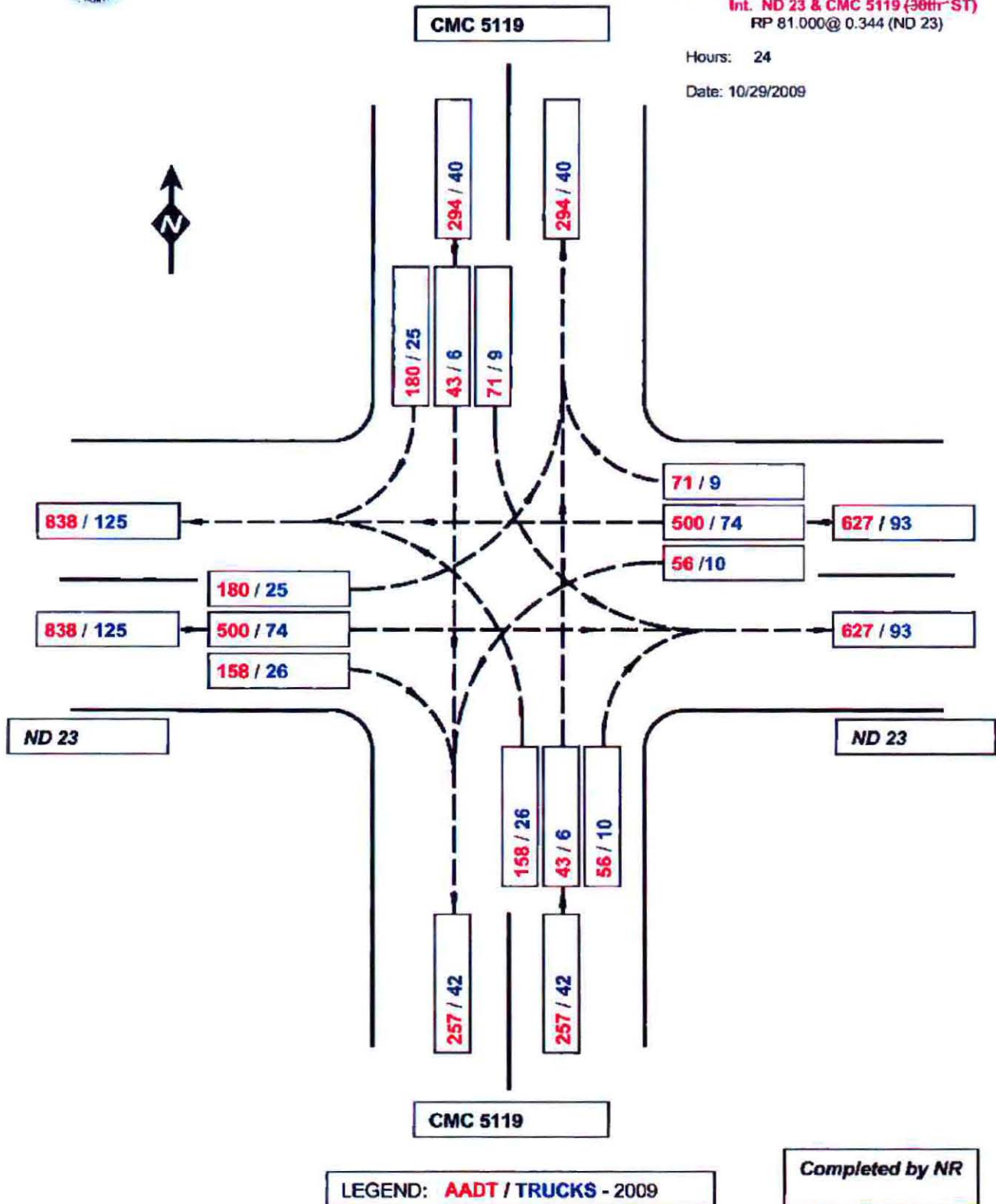
Intersection Traffic Volumes
 North Dakota Department of Transportation
 SFN 7921 (Rev. 4-85)

Intersection No: 3

Description: Ward 338th St
 Int. ND 23 & CMC 5119 (30th St)
 RP 81.000 @ 0.344 (ND 23)

Hours: 24

Date: 10/29/2009





Intersection Traffic Volumes
North Dakota Department of Transportation
SFN 7921 (Rev. 4-85)

Intersection No: 3

Description: Ward

Int. ND 23 & CMC 5119 (38th ST)
RP 81.000@ 0.344 (ND 23)

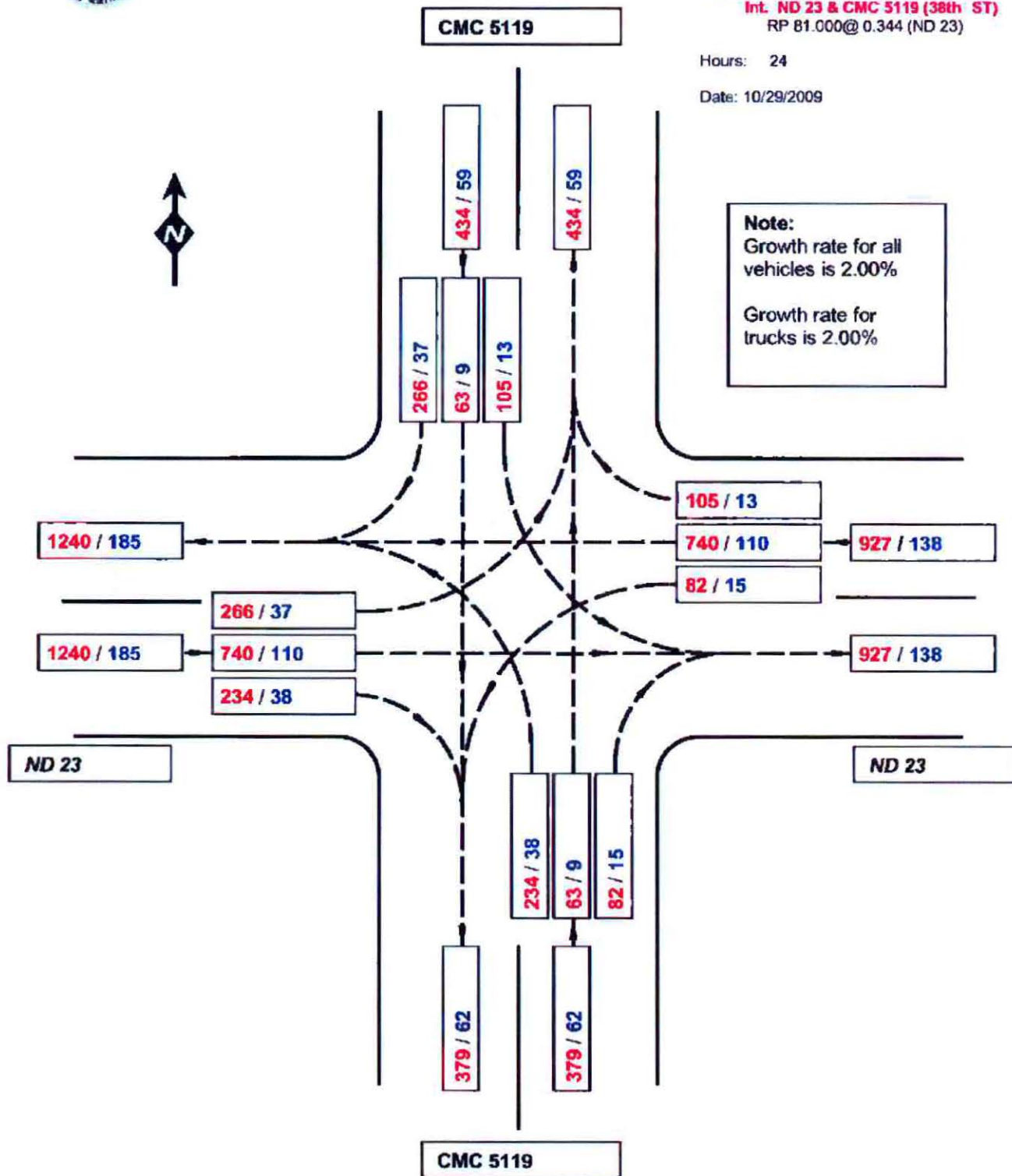
Hours: 24

Date: 10/29/2009

Note:

Growth rate for all vehicles is 2.00%

Growth rate for trucks is 2.00%



LEGEND: **AADT** / **TRUCKS** - 2029

Completed by NR



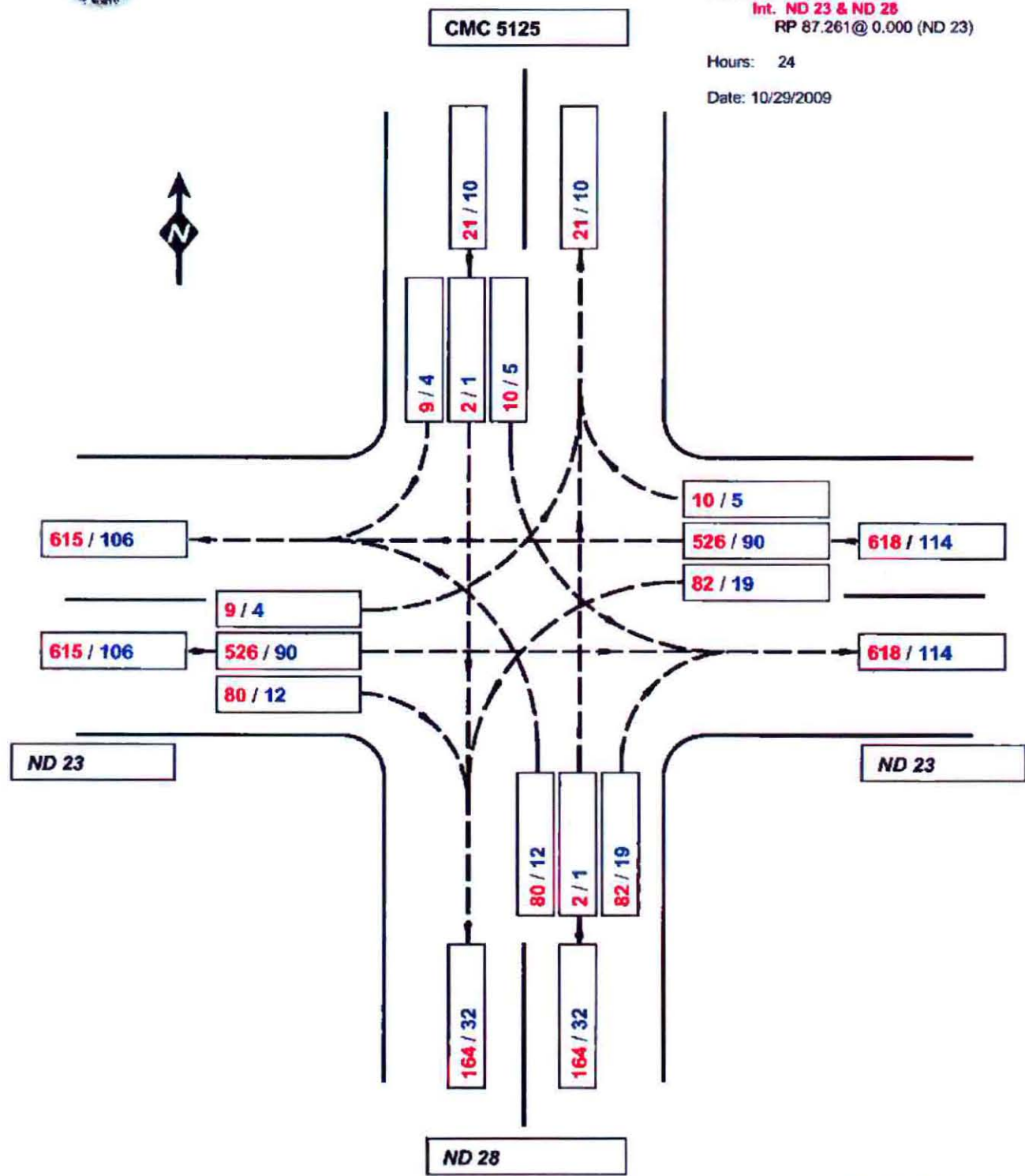
Intersection Traffic Volumes
North Dakota Department of Transportation
SFN 7921 (Rev. 4-85)

Intersection No: 2

Description: Ward
Int. ND 23 & ND 28
RP 87.261 @ 0.000 (ND 23)

Hours: 24

Date: 10/29/2009



LEGEND: AADT / TRUCKS - 2009

Completed by NR



Intersection Traffic Volumes
North Dakota Department of Transportation
SFN 7921 (Rev. 4-85)

Intersection No: 2

Description: Ward

Int. ND 23 & ND 28

RP 87.261 @ 0.000 (ND 23)

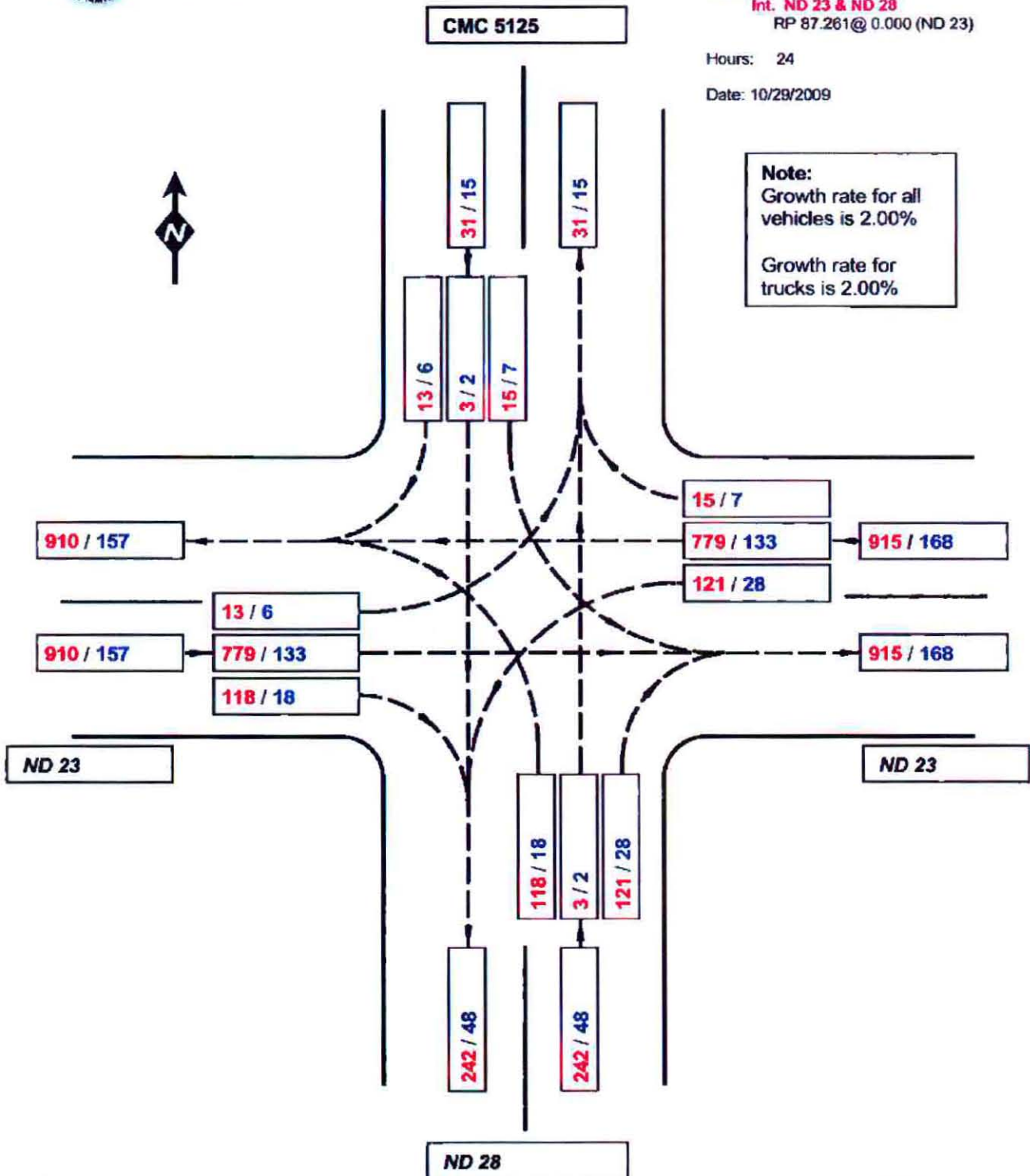
Hours: 24

Date: 10/29/2009

Note:

Growth rate for all vehicles is 2.00%

Growth rate for trucks is 2.00%



LEGEND: AADT / TRUCKS - 2029

Completed by NR



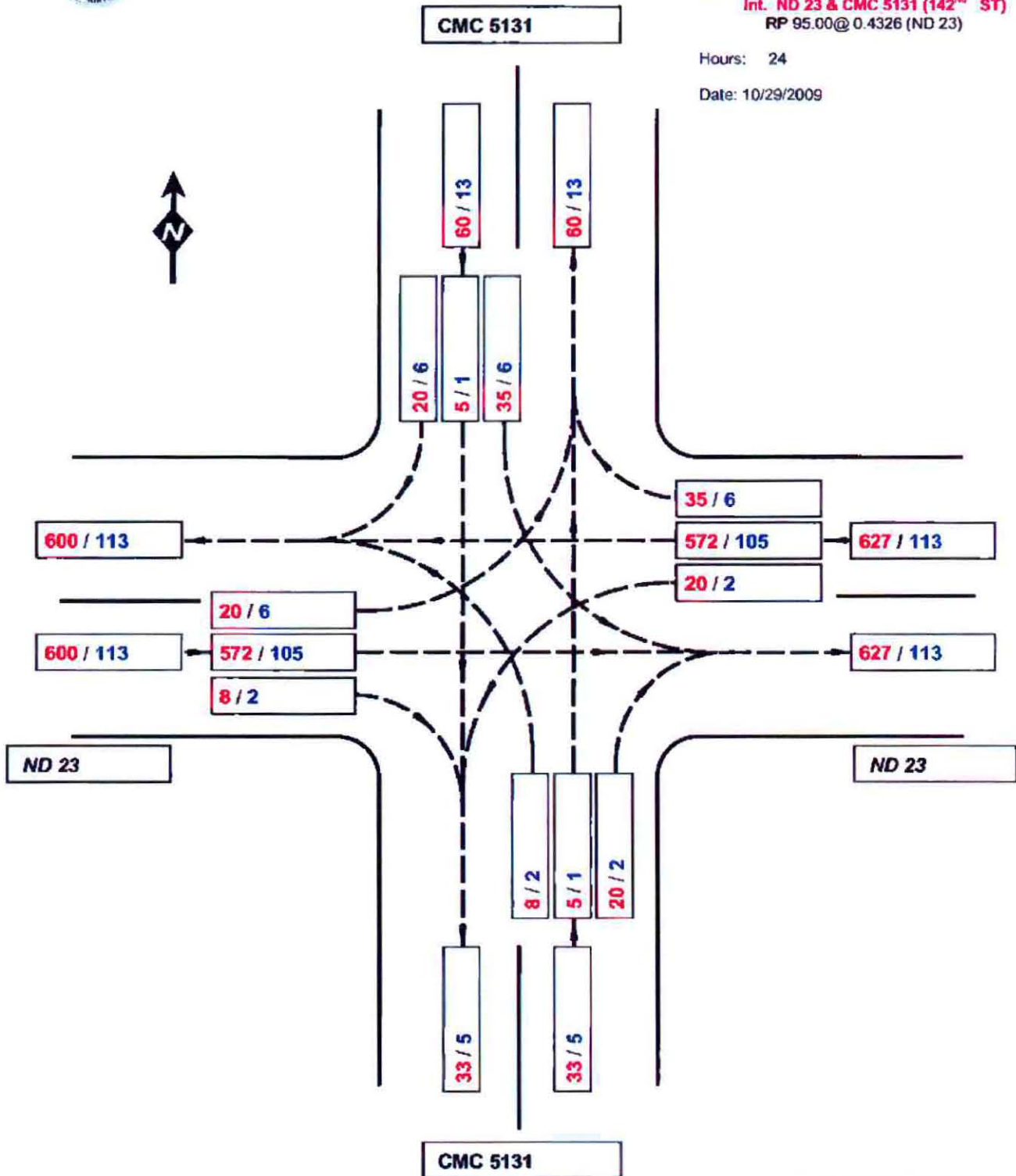
Intersection Traffic Volumes
North Dakota Department of Transportation
SFN 7921 (Rev. 4-85)

Intersection No: 1

Description: Ward
Int. ND 23 & CMC 5131 (142nd ST)
RP 95.00@ 0.4326 (ND 23)

Hours: 24

Date: 10/29/2009





Intersection Traffic Volumes
 North Dakota Department of Transportation
 SFN 7921 (Rev. 4-85)

Intersection No: 1

Description: Ward

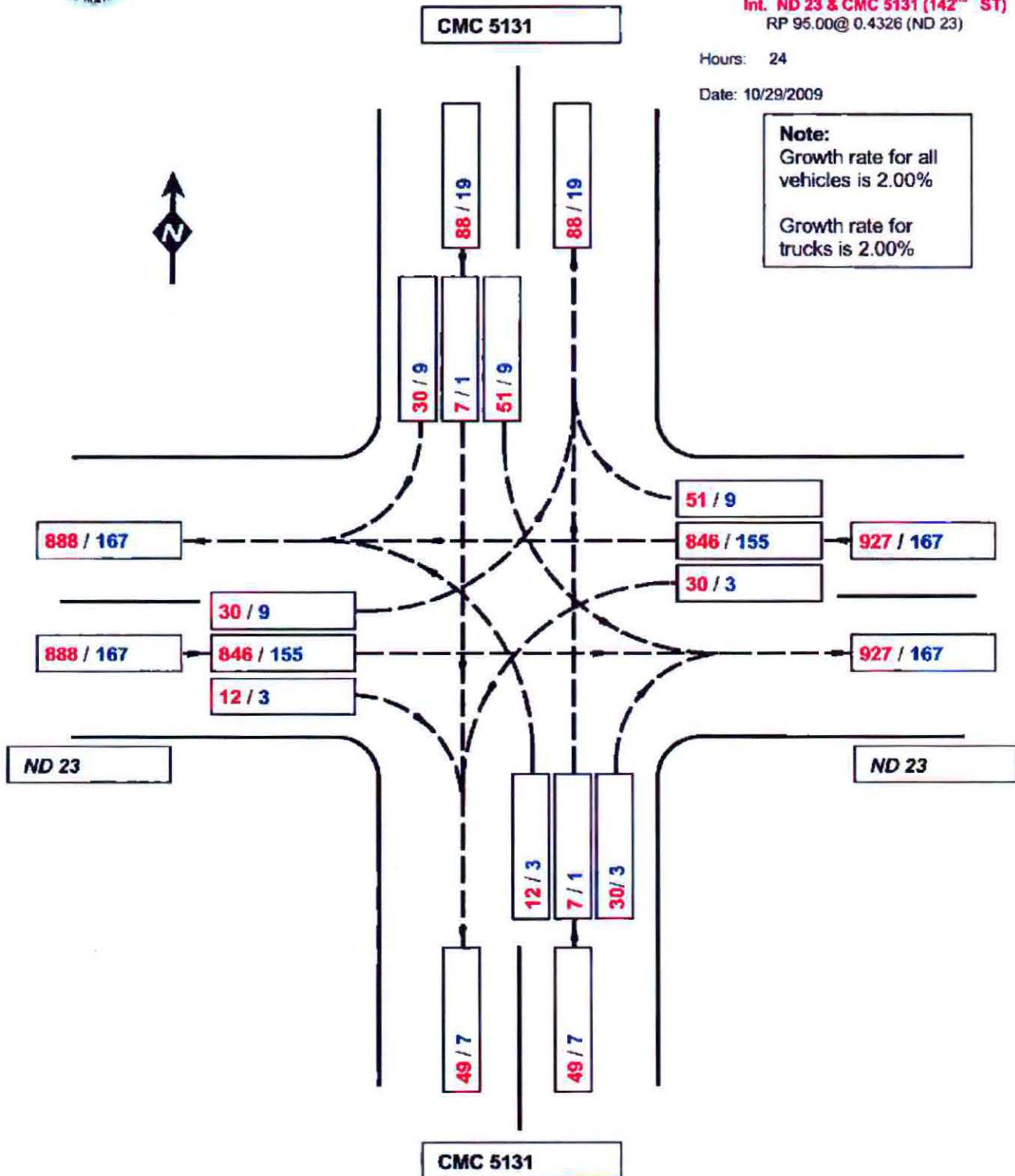
Int. ND 23 & CMC 5131 (142nd ST)
 RP 95.00@ 0.4326 (ND 23)

Hours: 24

Date: 10/29/2009

Note:
 Growth rate for all
 vehicles is 2.00%

 Growth rate for
 trucks is 2.00%



LEGEND: AADT / TRUCKS - 2029

Completed by NR