Road Safety Audit

Ossipee, New Hampshire

NH 28/NH 171 Intersection

Date RSA Conducted: June 26, 2012

Date of Final Report Distributed: Aug. 6, 2012

Date strategies last updated: 1/10/14

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Road Safety Audit Report

Project Title: Ossipee, NH – NH 28/NH 171 Intersection

Date Audit Conducted: June 26, 2012

RSA Team and Participants:

Town of Ossipee	Adam Riley	Fire Chief
	Brad Harriman	Public Work Director
	Lt. James Eldridge	Police Department
	Sgt. Robert King	Police Department
	Kathleen Maloney	Board of Selectmen
	Harry Merrow	Board of Selectmen
Lakes Region Planning Commission	Michael Izard	Principal Planner
NHDOT	Stuart Thompson	Safety Engineer
	Nancy Spaulding	Preliminary Design Engineer
NHDOT District 3	Mark Morrill	District Engineer
CHA	Nicolas Bosonetto	Project Engineer

Project Characteristics:

Audit type: Existing Roads
Units of Measure: US - Imperial
Adjacent Land Use: Residential/Commercial/Institutional
Posted Speed Limits: NH 28 - 40 mph, NH 171 – 35 mph. Note: NH 28 speed limit is 55 mph before and after intersection.
Functional Classification: NH 28 – Minor Arterial, NH 171 – Minor Collector
Terrain: Rolling, rural
Climatic Conditions: Cold winters with snow – icing possible
Location: Town of Ossipee, NH

NHDOT Project Number: 16215-C

Background:

The Town of Ossipee is located in the lakes region, close to the Maine state line. It has a population of 4,345 as of the 2010 census. Ossipee has a busy summer season due to its tourism and recreational opportunities in the mountains and lakes. The main routes through town are NH 28 which runs southwest to Wolfeboro and Lake Winnipesaukee and NH 16 which runs north to the White Mountains and south to Rochester. Most of the commercial development is located near the intersection of NH 16 and NH 28.

There are two main settlements in town – Center Ossipee near the NH 16/NH 25 intersection, and Ossipee Corner located east of the NH 28/NH 171 intersection. Center Ossipee contains municipal offices as well as the local elementary school. Ossipee Corner was the historical village and houses the old county courthouse (now the historical society), train depot, and other historic buildings.

The Town of Ossipee is the county seat for Carroll County. Most county functions are housed at the county complex located on NH 171, about a mile west of NH 28. This facility hosts the district court, family court, superior court, Sheriff offices, a new nursing home, administrative offices, registry of deeds, and the county jail. There are currently on-going talks to re-develop the old nursing home located at the county complex to house additional county services. A majority of the traffic accessing the county complex uses the NH 28/NH 171 intersection.

Concerns over safety at the intersection of NH 28/NH 171 have been ongoing. Ossipee town officials presented these concerns to the Transportation Advisory Committee (TAC) of the Lakes Region Planning Commission and subsequently filled out a request for a Road Safety Audit (RSA) with NHDOT. The intersection is shown in Figure 1 below:

Figure 1 - Project Location Map

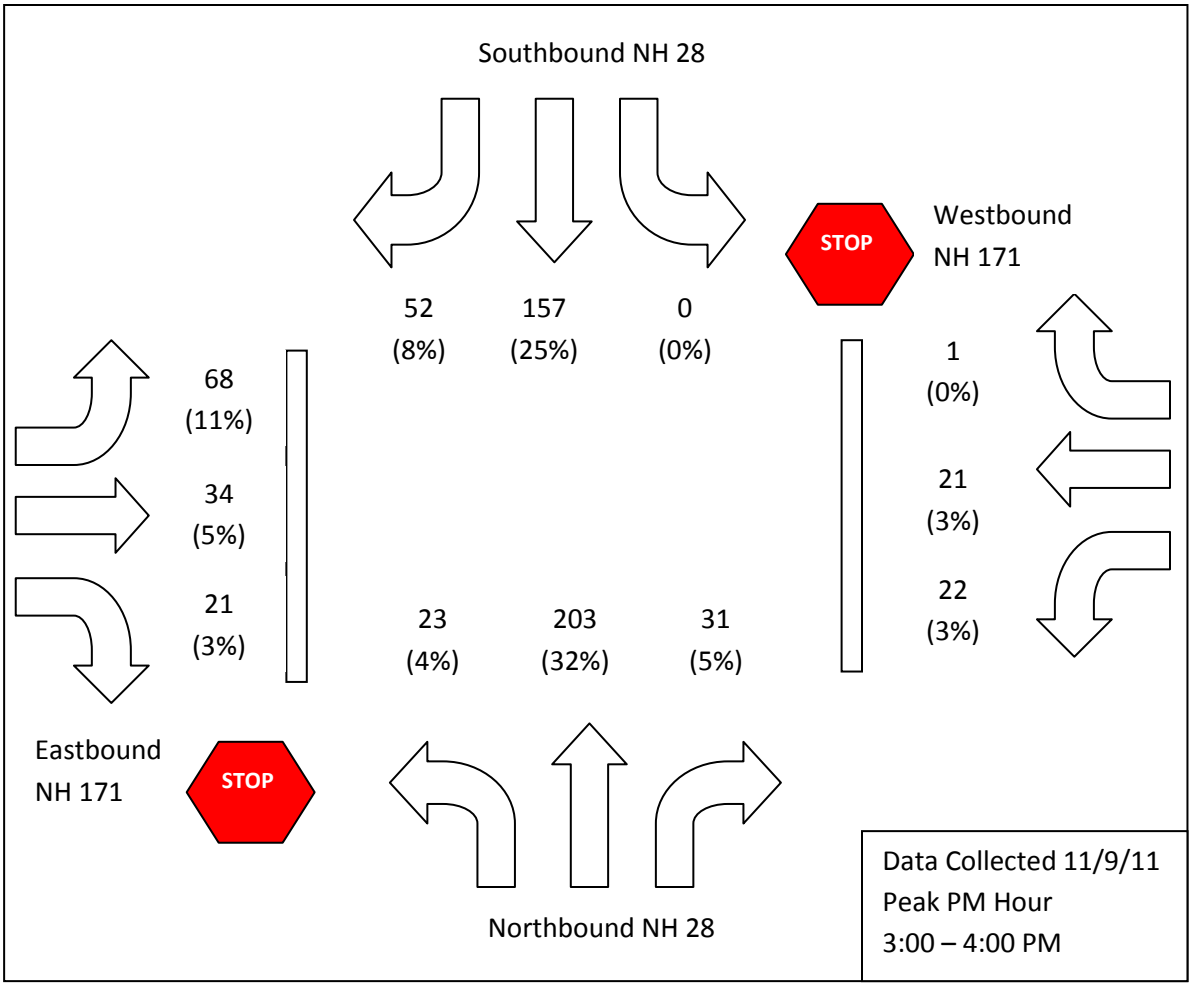
NH 28/NH 171 Intersection

The NH 28 and NH 171 intersection is located near Ossipee Corner, about two miles south of NH 16. The area around the intersection is scarcely developed without any curb cuts on NH 28. There are two legal offices and a medical clinic located on NH 171 just off the intersection. There are large tracts of undeveloped woodland along both sides of NH 28 which could eventually be developed if the market demand was to pick up. There are no sidewalks or crosswalks in the area. The historic village of Ossipee Corner is about 800 feet east on NH 171 and the Carroll County complex is about 1 mile west on NH 171. County Farm Road is a small dirt road just south of the intersection which is primarily used for emergency access to the county complex. Figure 2 below shows a close up of the area.

Figure 2- NH 28/NH 171 Intersection

NH 28 has an average daily traffic count of 3,398 vehicles per day traveling northbound[1] and an average daily traffic count of 2,643 vehicles per day southbound.[2] NH 171 has an average daily traffic count of 1,028 vehicles per day.[3] It was noted by the RSA Team that the traffic counter on NH 171 is located west of the county complex and therefore may not capture all of the vehicle traffic going to the county complex. The Lakes Region Planning Commission conducted turning movement counts at the subject intersection on November 9, 2011. The peak hours at the intersection are from 8:00 to 9:00 AM (514 vehicles) and from 3:00 to 4:00 PM (633 vehicles). Most of the PM traffic (360 out of 633 vehicles) is thru traffic on NH 28. The largest volume of turning movements is left turns from NH 171 EB onto NH 28 NB (68 vehicles) and NH 28 SB turning right onto NH 171 (52 vehicles). The speed limit on NH 28 is 40 mph at the intersection with 55 mph zones just before and after the intersection. Figure 3 shows the PM peak hour counts.

Figure 3 – PM Peak Turning Movement Counts



[1] Traffic Count conducted August 2010 on NH 28 at Wolfeboro T/L (station 357026).

[2] Traffic Count conducted August 2010 on NH 28 at Wolfeboro T/L (station 357027).

[3] Traffic Count conducted May 2011 on NH 171 west of County Farm Rd (station 357058).

Accident data for the NH 28/NH 171 intersection was collected from February 2002 to January 2012. There were a total of 32 multi-vehicle crashes and 1 single vehicle crash. Although there were no fatalities, 17 of these crashes resulted in injuries (53%). Figure 4 shows the collision diagram – accidents with circles designate injury accidents. A summary of crash data is as follows:

- 91% of accidents occurred during daylight;
- 76% of crashes involved right-angle collisions – NH 171 traffic failure to yield;
- 88% of injury crashes where right-angle collisions between NH 171 and NH 28 traffic;
- 9% of crashes involve rear-end/sideswipe collisions;
- No pedestrian/bicyclist involved.

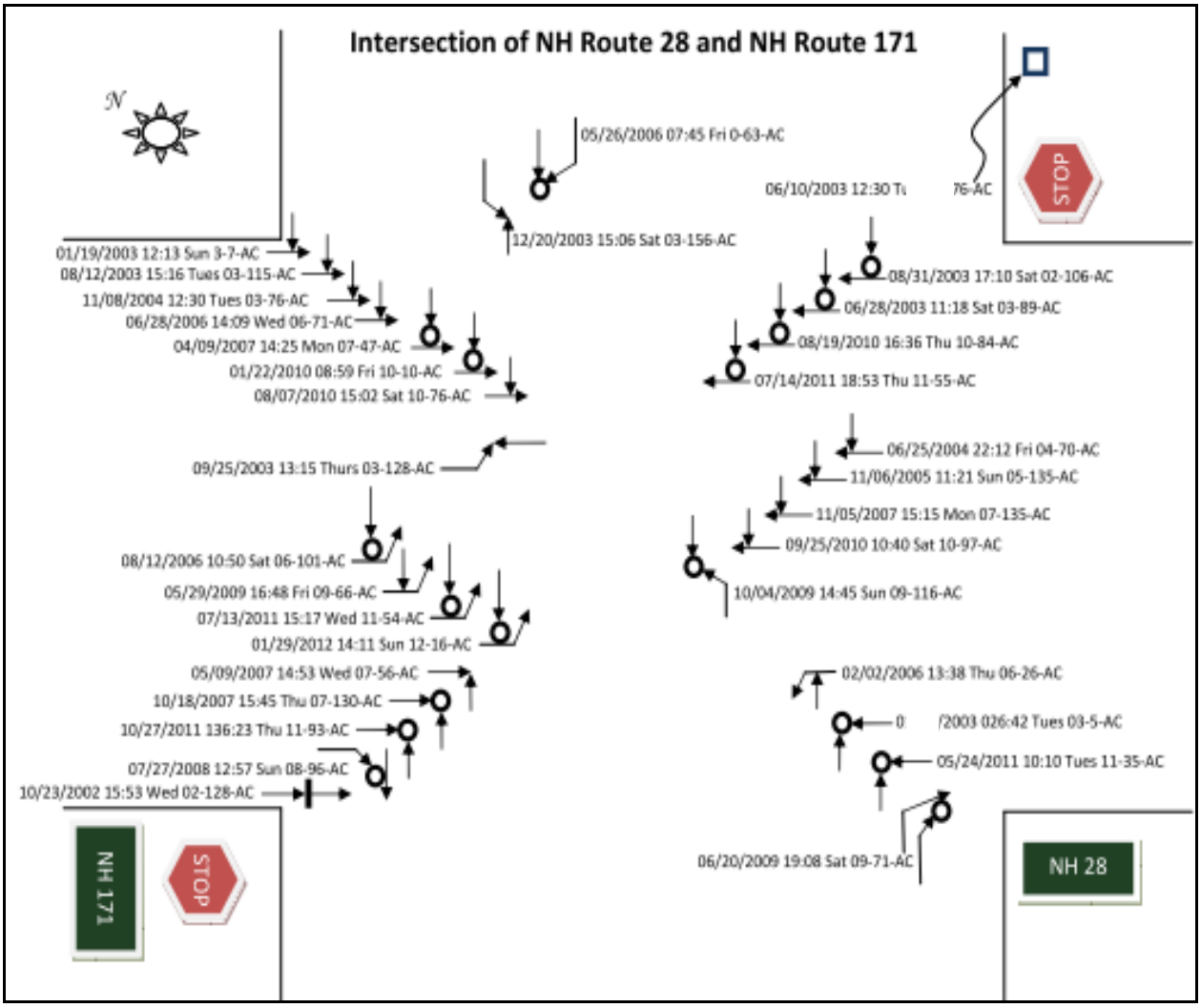


Figure 4 - Collision Diagram

Road Safety Audit Process:

The Road Safety Audit (RSA) is an eight step process. Step 1 and Step 2 were completed by NHDOT and the Lakes Region Planning Commission. Together they selected the intersection for study and identified the key stakeholders, owners, and consultants necessary to conduct the RSA. This RSA Team was involved in Steps 3 through 6. NHDOT will be responsible for Steps 7 and 8.

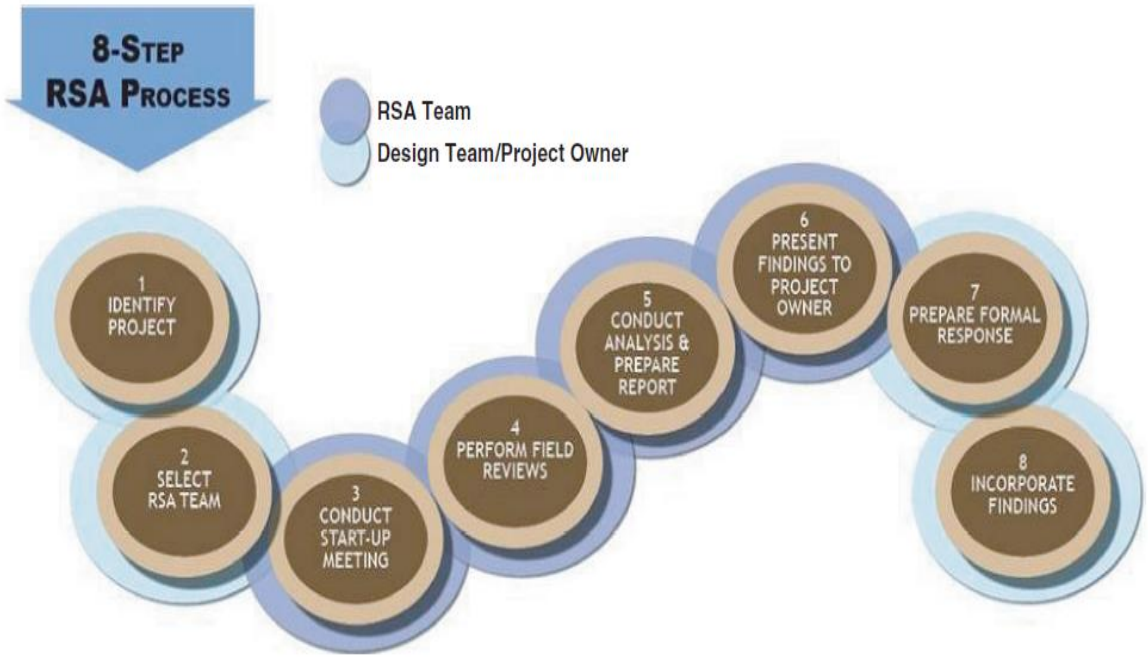


Figure 5 – RSA Process

The RSA Team met on June 26, 2012 at the Ossipee Town Hall. The agenda was as follows:

1. Presentation of the RSA process, scope, and objectives to the RSA Team;
2. Present background information on project area;
3. Group discussion on safety issues and concerns;
4. Field review at project site;
5. Discussion of site observations, risk assessment, and possible solutions;
6. Discussion of next steps.

Stakeholder Concerns:

A field visit was conducted between 10:15 and 11:15 AM on June 26, 2012. The weather was cool and overcast. During the start-up meeting the RSA Team was provided with a list of possible safety concerns to consider during their inspection of the intersection. As a result of this site visit and discussions during the start-up meeting, the following concerns and comments were raised:

- Town officials felt a lot of the problem was due to motorists using their right-turn signal to turn from NH 16 to NH 28 southbound. The geometry of the slip ramp at the NH 16/NH 28 intersection is not sharp enough to cancel the turn signal once on NH 28. Therefore vehicles approaching the NH 171 intersection may have the turn signal on. Motorists on the eastbound approach of NH 171 mistakenly think the vehicle is turning right onto NH 171 and proceed through the intersection causing serious accidents. (see Figure 6)
- A privately funded "Check your Turn Signal" sign was installed at the NH 16/NH 28 intersection. However, this sign had to be placed outside the state ROW and is therefore not very visible. (see Figure 7)

Figure 6 - NH 16 Slip Ramp

Figure 7 - 'Check your turn signal' sign

- NH 28 through traffic has a tendency to bypass vehicles turning right onto NH 171. The through traffic veers into the left turn lane and crosses the yellow lines. NH 171 traffic sometimes does not see the trailing vehicle or does not expect the trailing vehicle to bypass the right turning vehicle and proceed into the intersection.
- First responders report that all the crashes at the intersection are severe. Even when no injuries are reported, vehicles are usually towed away.
- Speed is a factor in the severity of the accidents. The speed limit drops to 40 MPH in the area of the intersection, but it is 55 MPH before and after. Traffic does not tend to slow down.
- Sight distance is also a factor. The vertical alignment of NH 28 north of the intersection creates a crest vertical curve which can obscure approaching vehicles. This problem is compounded in the winter months when snow banks decrease sight lines. Yard signs placed on the roadside also create sight line issues.
- The intersection is not very visible traveling west on NH 171. Large trees and the horizontal curvature hide the stop sign and flashing beacon.
- The stop bars on NH 171 have faded/worn out and are no longer visible. District 3 reported that funding has been cut for re-striping low volume roads. Therefore, there is no plan to repaint NH 171.
- There are two stop signs on NH 171 eastbound. For NH 171 westbound there is only one on the right side.
- There is a lot of traffic accessing the nursing home, medical clinic, and court facilities who may not be familiar with the intersection or who may be elderly.

- Due to the speed of traffic on NH 28, NH 171 traffic has to look three or four times in each direction to make sure intersection is clear.
- NH 171 approaches NH 28 at a skewed angle.
- Fire and police personnel reported that a crash rate of about 6 per year was customary,
- The previous police chief had suggested a traffic light be installed, but Town officials did not like that idea, (**at the Board of Selectmen meeting 1/6/14 it was pointed out that this is incorrect**)
- New stop-ahead signs have been installed in the previous year and brush has been cut back in an effort to increase visibility at the intersection,
- About 25 years ago the median islands on NH 28 were removed in order to add the left turn lanes,
- The right turn ramps and flashing beacon have been there as long as anyone could remember,
- There is truck traffic using NH 171 to access water bottling facility to the north in Moultonborough,
- There is some pedestrian/bicycle traffic at the intersection. During the field visit three pedestrians were observed walking along the road.

Figure 8 - NH 28 Southbound

Risk Analysis:

Based on the data presented, stakeholder discussion, and site evaluation, the RSA Team identified and prioritized safety issues and concerns. Safety issues can be prioritized as low, medium, high or extreme risk based on the criteria shown in tables below. Table 1 shows how the severity rating for each safety issue is measured. Table 2 is a matrix using the severity rating from Table 1 and the frequency rating to find the Crash Risk Rating.

Table 1 - Severity Rating

TYPICAL CRASHES EXPECTED (per RSA item)	EXPECTED CRASH SEVERITY	SEVERITY RATING
crashes involving high speeds or heavy vehicles, pedestrians, or bicycles	probable fatality or incapacitating injury	*Extreme*
crashes involving medium to high speed; head-on, crossing, or off-road crashes	moderate to severe injury	*High*
crashes involving medium to low speeds; left-turn and right-turn crashes	minor to moderate injury	*Moderate*
crashes involving low to medium speeds; rear-end or sideswipe crashes	property damage only or minor injury	*Low*

Table 2 - Risk Rating

FREQUENCY RATING	SEVERITY RATING			
	Low	*Moderate*	*High*	*Extreme*
Frequent	**C**	**D**	**E**	**F**
Occasional	**B**	**C**	**D**	**E**
Infrequent	**A**	**B**	**C**	**D**
Rare	**A**	**A**	**B**	**C**
Crash Risk Ratings:	A: lowest risk level	C: moderate-low risk level	E: high risk level	
	B: low risk level	D: moderate-high risk level	F: highest risk level	

The following charts summarize the risk analysis and mitigation strategies that were discussed.

	Safety Issue	Safety Risk	Crash Severity	Crash Frequency	Crash Risk Rating
1	Limited sight line between NH 171 westbound of NH 28 southbound traffic, especially with snow banks or third-party yard signs.	Drivers who are unable to see oncoming traffic will prematurely proceed into intersection causing right-angle crashes.	**High** – 35% of all injury crashes at this intersection are NH 171 westbound traffic failing to yield to NH 28 traffic.	**Frequent** – 33% of crashes at intersection are NH 171 westbound traffic failing to yield to NH 28 traffic.	High Risk Level
2	NH 171 westbound has poor visibility of upcoming intersection.	Traffic on westbound NH 171 may not see stop sign in time and enter intersection without stopping.	**High** – 35% of all injury crashes at this intersection are NH 171 westbound traffic failing to yield to NH 28 traffic.	**Rare** – Since most traffic on this approach is local, it would be rare for someone to run the stop sign.	Low Risk Level
3	NH 28 through traffic bypassing right -turning traffic or through traffic erroneously have turn signals on.	NH 171 traffic waiting at intersection may proceed into intersection when drivers appear to be turning right. If turning signal is erroneous or if trailing vehicle bypasses turning vehicle, crash may occur.	**High** – Right angle crashes are 88% of all injury crashes at this intersection.	**Frequent** – Anecdotal evidence and field review show high incidence. 25% of NH 28 southbound traffic turns right.	High Risk Level
4	NH 171 intersects NH 28 at a skewed angle.	Skewed intersections reduce visibility, especially for older drivers	**High** – Right angle crashes are 88% of all injury crashes at this intersection.	**Occasional** – Skew of intersection is a contributing factor	Moderate-High Risk Level
5	NH 28 traffic travels over 40 MPH.	Higher speeds reduce reaction time and increase severity of crashes	**High** – Right angle crashes are 88% of all injury crashes at this intersection.	**Frequent** – Most of NH 28 traffic appears to be traveling at high speeds.	High Risk Level

Risk Mitigation Strategies:

Next the RSA Team brainstormed ideas on how these safety issues could be corrected. All suggestions were welcomed and considered. Each possible risk-mitigation solution was categorized as a long, medium, or short term solution based on when they could be implemented. Short term solutions could feasibly be accomplished within six months, medium term within six months to two years, and long term solutions would be those that would take more than two years to implement.

	Suggested Strategy	Risk(s) Addressed	Mitigation Timeframe	Responsible Stakeholder
A	New "Check Your Signal" sign placed on state ROW	3	Short	NHDOT
B	Build a roundabout	All	Long	NHDOT/LRPC
C	Speed enforcement: a. using speed trailer b. using police vehicles	5	a. Medium b. Short	Ossipee
D	Build right turning lane for NH 28 southbound	3	Medium	NHDOT
E	Lower profile on NH 28	1	Long	NHDOT
F	Reconfigure slip ramp at NH 16 so that turn signals cancel out	3	Medium	NHDOT
G	Reconfigure island/slip ramp on NH 171	1, 4	Medium	NHDOT
H	Repaint stop bars on NH 171	2	Short	NHDOT
I	Place stop sign on island for NH 171 westbound	2	Short	NHDOT
J	Control/remove signs at intersection	1	Short	NHDOT/Ossipee
K	Create Access Management Plan for NH 28 near intersection	*	Medium	Ossipee/LRPC

*This strategy addresses future potential risks.

Summary:

High Risk Safety Issues

As previously discussed, the RSA Team identified three high risk safety issues as contributing factors that make this intersection dangerous. Namely these issues had to do with the sight distance between turning vehicles and NH 28 traffic, NH 28 traffic mistakenly having their turn signals on, and the high speed of NH 28 traffic. To address these high risk safety issues, nine possible solutions were offered:

Short Term Solutions:

1. NHDOT to research possibility of placing a "Check your turn signal" or similar sign on state ROW.
2. NHDOT and Ossipee to coordinate removal of third party signs at intersection in order to maintain unobstructed sight distances.
3. Ossipee to continue enforcing speed limit at intersection using police personnel.

Medium Term Solutions:

1. NHDOT to evaluate if intersection needs upgraded beacon.
2. Ossipee to investigate acquisition of speed trailer to enforce speed limit at intersection.
3. NHDOT to evaluate possible reconfiguration of NH 171 approaches at intersection as follows:
    a. Build dedicated right-turn lanes for NH 28 traffic to tie into existing slip ramps; and/or
    b. Reconfigure existing pork-chop islands on NH 171 to make intersection less skewed.
4. NHDOT to evaluate reconfiguring NH 16 ramp onto NH 28 southbound into a sharper turn in order to cancel out vehicles' turn signal.

Long Term Solutions:

1. NHDOT in collaboration with Lakes Region Planning Commission to investigate potential for building a roundabout at the intersection.
2. NHDOT to evaluate potential of re-grading NH 28 to remove vertical crest curve north of intersection.

Figure 9 - NH 171 eastbound approach

Figure 10 - NH 171 westbound approach

Figure 11 - NH 171 Westbound

Figure 12 - NH 171 Eastbound approach

Moderate/Low Risk Safety Issues

Only one low risk safety issue was identified by the RSA Team for this intersection. This issue was the poor visibility of the intersection for the NH 171 westbound. Four possible solutions were offered:

Short Term Solutions:

1. NHDOT to investigate whether they can repaint the stop bars with thermoplastic paint.
2. NHDOT to investigate whether they can place a stop sign on the splitter island.

Medium Term Solutions:

1. NHDOT to evaluate if intersection needs upgraded beacon.
2. Town of Ossipee and Lakes Region Planning Commission to evaluate whether an access management plan is suitable for this location to address future development at the intersection.

Audit Response:

Submission of this report represents completion of Steps 1 through 6 of the RSA process. NHDOT, as the project owner, will prepare a formal response addressing the audit findings. The responses should outline what actions the owner will take related to each safety concern listed in the report. NHDOT may either:

- Agree with the suggestion described by the audit team and commit to its implementation outlining a schedule for the completion of the suggestion;
- Disagree with the suggestion described by the audit team and commit to an alternative, outlining a schedule for the completion of the alternative. In doing so, the owner should provide a valid reason as to why they choose not to adopt the audit team's suggestions;
- Choose not to implement certain improvements at all due to constraint or disagreement regarding the safety issue, believing that there is no increased risk associated with the concern raised by the audit team. In doing so, the owner should document the reasoning behind their decision.

NHDOT will present the formal response to the Board of Selectmen, at which point they may comment on the final recommendations.

Ossipee NH 28/NH171 Status Summary

#	Suggested Strategy	Responsible Stake holder	Solutions:	Comments	Date Completed
1	Research possibility of placing a "Check your turn signal" or similar sign on state ROW.	NHDOT Highway Design for Ossipee project #10431	Short Term	Placing a sign like this is not allowed as it does not follow MUTCD standards. Instead of the sign research what is actually causing the turn signal to not be turned off. The NH 16 ramp onto NH 28 southbound ramp is scheduled to be reconfigured under the NHDOT construction project, Ossipee 10431.	NHDOT standards do not allow this strategy
2	Coordinate removal of third party signs at intersection in order to maintain unobstructed sight distances.	Ossipee with NHDOT-Traffic Bureau	Short Term	Coordination with Town and State needs to be done Submit work order	**Submitted work order to Traffic 11/26/13**
3	Police enforcement of speed limit thru the intersection	Ossipee Police Department	Short Term	NHDOT is not sure if this is being done	**On-going option**
4	Investigate if the stop bars can be repainted with thermoplastic paint.	NHDOT - Traffic Bureau	Short Term	HSIP funds would pay for the first painting but any additional paint on Town roads would be paid for by the Town Submit work order	Submitted work order to Traffic 11/26/13
5	Investigate if a stop sign can be placed on the splitter island.	NHDOT-Traffic Bureau	Short Term	Submit work order	Submitted work order to Traffic 11/26/13
6	Evaluate if intersection needs an upgraded beacon or if it should be removed	NHDOT-Traffic Bureau	Medium Term	NHDOT practice is to evaluate the intersection and remove as many beacons as possible Submit work order	Submitted work order to Traffic 11/26/13
7	Ossipee to investigate acquisition of speed trailer to enforce speed limit at intersection.	Ossipee	Medium	NHDOT is not sure if this is being done	On-going option
8	Reconfiguring NH 16 ramp onto NH 28 southbound into a sharper turn in order to	See #1 above	See #1 above	This is described in strategy number 1 (see above)	Will be reconfigured under the NHDOT

	cancel out vehicles' turn signal.				construction project, Ossipee 10431.
10	Town of Ossipee and Lakes Regional Planning Commission to evaluate whether an access management plan is suitable for this location to address future development at the intersection.	Ossipee and Regional Planning Commission	Long term	This needs to be a continuous effort for the future and NHDOT is not sure if this is being done or planned.	On-going option
11	NHDOT to evaluate possible reconfiguration of NH 171 approaches at intersection as follows: a. Build dedicated right-turn lanes for NH 28 traffic to tie into existing slip ramps; and/or b. Reconfigure existing pork-chop islands on NH 171 to make intersection less skewed.	NHDOT	Long term (Medium if right turn lanes and islands are all within the ROW)	Design concepts have been drafted and shown to NHDOT Front Office for their comments on 11/12/13. At the NHDOT Front Office meeting this option was discussed and the right turn lane may cause sight distance issues. The side roads may have limited sight distance if the sight turn lane vehicles block sight of the thru lanes. This was reviewed by Highway Design and the as-built plans do not show a problem with the profile. This design was shown to the Board of Selectmen for their opinions. It was asked to evaluate a signal at the intersection.	Front Office Meeting Date 11/12/13 HSIP Committee meeting 12/19/13 Board of Selectmen meeting 1/6/14 Work order submitted for Traffic counts 1/9/14 to RPC
12	NHDOT in collaboration with Lakes Region Planning Commission to investigate potential for building a roundabout at the intersection.	NHDOT	Long term	Design Concepts have been drafted and shown to NHDOT Front Office for their comments on 11/12/13. At the NHDOT Front Office meeting there were no comments on this Design. ROW construction easements or takes will need to be acquired to construct this design. **HSIP Committee does not support a roundabout at this location**.	**Option Complete** Front Office Meeting Date 11/12/13 HSIP Committee meeting 12/19/13
13	NHDOT to evaluate potential of re-grading NH 28 to remove vertical crest curve north of Intersection	NHDOT	Long Term	• Highway Design needs to do more design for this concept prior to showing the Town (including the cost) • Highway Design reviewed this option and the as-built plans do not show a problem with the profile. No option for Design	**Option Complete** •Front Office Meeting Date 11/12/13 •Reviewed by Preliminary

Appendix A – Turning Movement Counts/Traffic Counts

Lakes Region Planning Commission
103 Main Street, Suite 3
Meredith, NH 03253
(603) 279-8171
Fax (603) 279 0200
www.lakesrpc.org

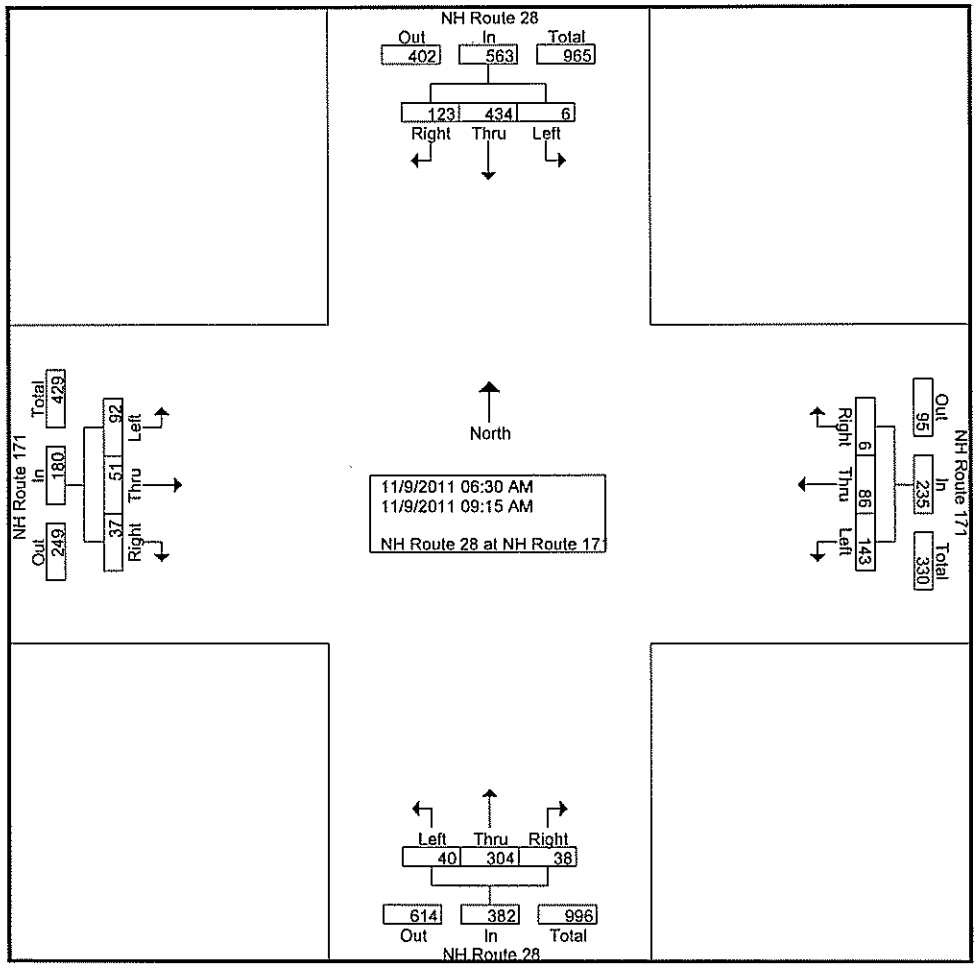
Town Of Ossipee
NH Route 28 at NH Route 171
November 9, 2011
6:30AM - 9:30AM

Groups Printed- NH Route 28 at NH Route 171

	NH Route 28 Southbound				NH Route 171 Westbound				NH Route 28 Northbound				NH Route 171 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
06:30 AM	1	42	12	55	8	8	0	16	3	8	1	12	3	4	5	12	95
06:45 AM	0	56	10	66	19	8	0	27	3	16	0	19	9	0	4	13	125
Total	1	98	22	121	27	16	0	43	6	24	1	31	12	4	9	25	220
07:00 AM	1	38	9	48	13	6	1	20	2	22	0	24	6	3	6	15	107
07:15 AM	0	34	3	37	8	6	1	15	0	28	4	32	9	7	2	18	102
07:30 AM	0	21	10	31	13	9	1	23	1	27	5	33	6	4	2	12	99
07:45 AM	1	38	6	45	12	3	2	17	4	22	4	30	7	2	2	11	103
Total	2	131	28	161	46	24	5	75	7	99	13	119	28	16	12	56	411
08:00 AM	0	35	15	50	10	7	0	17	4	28	3	35	10	3	1	14	116
08:15 AM	0	43	12	55	17	12	0	29	5	30	2	37	9	5	4	18	139
08:30 AM	1	26	11	38	12	7	0	19	3	36	5	44	9	8	4	21	122
08:45 AM	0	29	19	48	15	9	1	25	4	38	5	47	9	6	2	17	137
Total	1	133	57	191	54	35	1	90	16	132	15	163	37	22	11	70	514
09:00 AM	1	41	9	51	9	7	0	16	6	22	5	33	9	6	1	16	116
09:15 AM	1	31	7	39	7	4	0	11	5	27	4	36	6	3	4	13	99
Grand Total	6	434	123	563	143	86	6	235	40	304	38	382	92	51	37	180	1360
Apprch %	1.1	77.1	21.8		60.9	36.6	2.6		10.5	79.6	9.9		51.1	28.3	20.6		
Total %	0.4	31.9	9	41.4	10.5	6.3	0.4	17.3	2.9	22.4	2.8	28.1	6.8	3.8	2.7	13.2	

Lakes Region Planning Commission
103 Main Street, Suite 3
Meredith, NH 03253
(603) 279-8171
Fax (603) 279 0200
www.lakesrpc.org

Town Of Ossipee
NH Route 28 at NH Route 171
November 9, 2011
6:30AM - 9:30AM



Lakes Region Planning Commission
103 Main Street, Suite 3
Meredith, NH 03253
(603) 279-8171
Fax (603) 279 0200
www.lakesrpc.org

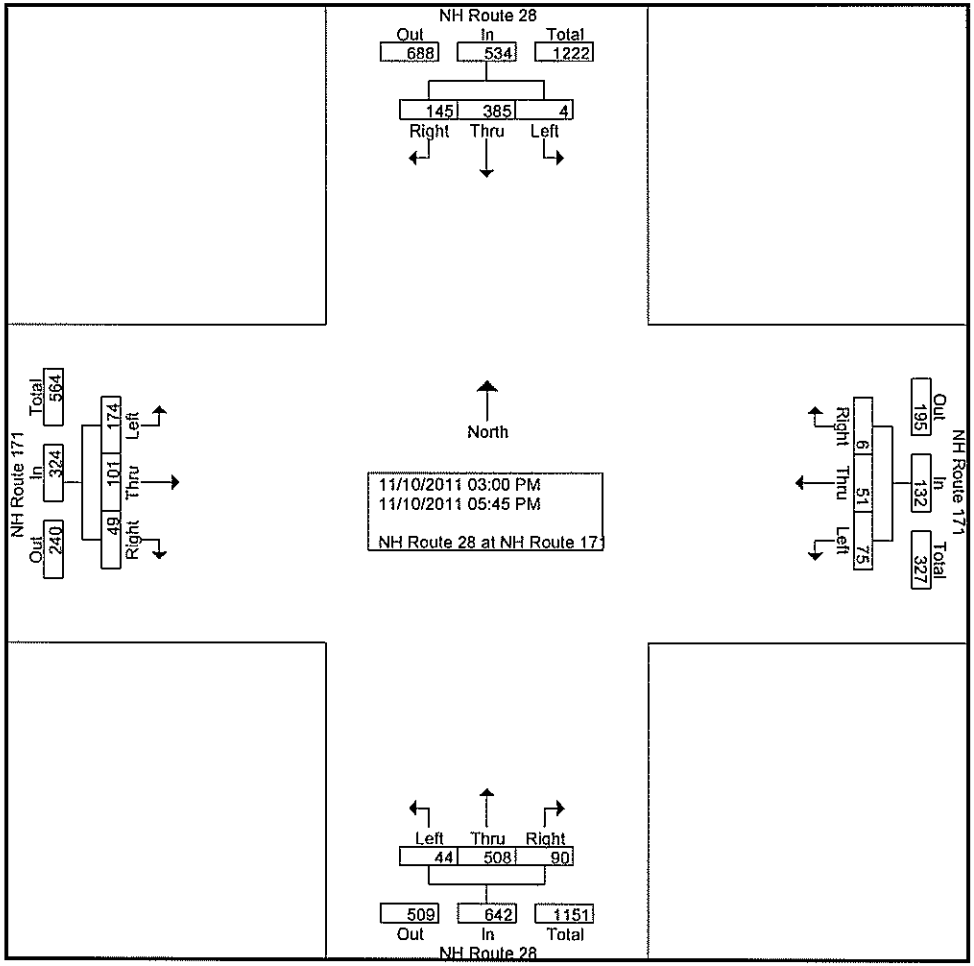
Town of Ossipee, NH
NH Route 28 at NH Route 171
November 10, 2011
3:00PM - 6:00PM

Groups Printed- NH Route 28 at NH Route 171

	NH Route 28 Southbound				NH Route 171 Westbound				NH Route 28 Northbound				NH Route 171 Eastbound				
Start Time	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Left	Thru	Right	App. Total	Int. Total
03:00 PM	0	32	15	47	4	5	0	9	13	52	7	72	19	11	6	36	164
03:15 PM	0	39	9	48	9	5	0	14	4	59	8	71	22	8	9	39	172
03:30 PM	0	49	11	60	4	2	1	7	2	42	6	50	13	7	5	25	142
03:45 PM	0	37	17	54	5	9	0	14	4	50	10	64	14	8	1	23	155
Total	0	157	52	209	22	21	1	44	23	203	31	257	68	34	21	123	633
04:00 PM	1	27	9	37	4	7	2	13	1	40	5	46	16	11	6	33	129
04:15 PM	1	31	20	52	13	6	0	19	4	55	10	69	23	11	1	35	175
04:30 PM	0	25	15	40	7	7	0	14	6	41	7	54	12	11	3	26	134
04:45 PM	1	29	8	38	6	7	1	14	0	39	3	42	10	6	5	21	115
Total	3	112	52	167	30	27	3	60	11	175	25	211	61	39	15	115	553
05:00 PM	0	25	11	36	4	0	0	4	4	37	4	45	19	7	7	33	118
05:15 PM	0	29	6	35	3	2	0	5	5	37	6	48	12	3	1	16	104
05:30 PM	1	26	14	41	7	1	2	10	1	32	15	48	12	8	3	23	122
05:45 PM	0	36	10	46	9	0	0	9	0	24	9	33	2	10	2	14	102
Total	1	116	41	158	23	3	2	28	10	130	34	174	45	28	13	86	446
Grand Total	4	385	145	534	75	51	6	132	44	508	90	642	174	101	49	324	1632
Apprch %	0.7	72.1	27.2		56.8	38.6	4.5		6.9	79.1	14		53.7	31.2	15.1		
Total %	0.2	23.6	8.9	32.7	4.6	3.1	0.4	8.1	2.7	31.1	5.5	39.3	10.7	6.2	3	19.9	

Lakes Region Planning Commission
103 Main Street, Suite 3
Meredith, NH 03253
(603) 279-8171
Fax (603) 279-0200
www.lakesrpc.org

Town of Ossipee, NH
NH Route 28 at NH Route 171
November 10, 2011
3:00PM - 6:00PM



STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC 4/3/2012

IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF MAY 2011

82 357058 OSSIPEE- NH 171 (WATER VILLAGE RD) WEST OF COUNTY FARM RD

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
5	22	1	3	4	0	1	3	9	10	22	53	67	100	88	112	83	80	81	73	70	58	33	22	11	5	7	995
5	17	3	4	1	2	1	4	9	48	53	77	62	61	78	53	73	72	94	80	69	58	25	22	12	16	7	981
5	18	4	2	1	1	3	4	12	51	52	58	51	50	55	56	51	56	98	77	78	60	41	29	12	12	8	918
5	19	5	2	1	0	3	8	16	48	50	62	60	81	65	58	64	76	100	98	92	56	38	36	23	13	10	1060
5	20	6	5	1	1	3	6	10	47	69	71	76	69	65	91	80	93	108	97	83	62	53	29	32	28	15	1194
5	21	7	8	2	3	2	3	9	26	38	54	55	93	93	71	76	71	84	79	70	55	44	29	22	21	8	1016

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
82	357058	2011	May	6	995	1038	1016	1028	31880		

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:
SUNDAY	67	112	81
WEEKDAY	68	76	100
SATURDAY	55	93	84

AM - 6 AM TO 10 AM
MIDDAY - 10 AM TO 2 PM
PM - 2 PM TO 8 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC 4/3/2012

IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION

AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF AUGUST 2010

81 357026 OSSIPEE- NH 28 NB SOUTH OF NH 16 (82357053)

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
8	8	1	36	9	5	5	7	13	31	72	158	178	214	234	208	219	206	208	174	143	110	99	74	37	25	27	2492
8	9	2	12	6	6	6	16	34	74	145	212	250	260	290	300	250	279	305	300	233	142	96	74	40	21	33	3384
8	4	4	5	10	8	1	12	36	84	181	206	261	246	266	282	243	272	307	298	220	146	116	89	66	42	36	3433
8	5	5	12	6	4	8	16	42	88	168	198	260	256	338	306	256	309	342	295	221	148	112	78	52	34	34	3583
8	6	6	16	6	5	8	17	30	86	171	204	238	270	330	306	320	306	350	316	274	222	178	126	103	55	55	3992
8	7	7	21	9	6	6	12	24	40	101	169	220	274	330	306	277	284	312	256	194	141	114	108	82	73	69	3428

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
81	357026	2010	August	6	2492	3598	3428	3398	105328		

PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:
SUNDAY	178	234	208
WEEKDAY	252	312	326
SATURDAY	220	330	312

AM - 6 AM TO 10 AM
MIDDAY - 10 AM TO 2 PM
PM - 2 PM TO 8 PM

STATE OF NEW HAMPSHIRE, DEPARTMENT OF TRANSPORTATION - BUREAU OF TRAFFIC 4/3/2012
IN COOPERATION WITH U.S. DEPARTMENT OF TRANSPORTATION FEDERAL HIGHWAY ADMINISTRATION
AUTOMATIC TRAFFIC RECORDER DATA FOR THE MONTH OF AUGUST 2010

61 357027 OSSIPEE- NH 28 SB AT WOLFEBORO TL (62357055)

MON	DATE	DAY	12 AM	1 AM	2 AM	3 AM	4 AM	5 AM	6 AM	7 AM	8 AM	9 AM	10 AM	11 AM	12 PM	1 PM	2 PM	3 PM	4 PM	5 PM	6 PM	7 PM	8 PM	9 PM	10 PM	11 PM	Total
8	8	1	28	11	5	5	5	6	34	50	109	153	172	180	175	187	184	185	133	123	89	78	64	41	26	23	2066
8	9	2	8	4	4	4	10	24	72	116	140	182	184	177	177	193	212	211	224	180	109	72	61	36	39	19	2458
8	4	4	9	9	4	1	14	32	53	73	134	193	183	189	215	178	160	255	261	187	127	91	83	71	45	24	2591
8	5	5	12	7	5	6	11	25	69	140	139	207	213	247	202	166	238	259	255	196	135	97	72	55	36	28	2820
8	6	6	18	6	2	6	14	24	63	133	167	188	161	222	221	243	235	262	226	247	196	133	81	87	49	52	3036
8	7	7	26	11	4	6	11	14	30	75	124	154	189	275	250	235	268	261	235	152	137	95	106	95	79	72	2904

TYPE	STATION	YEAR	MONTH	NO. DAYS	AVERAGE SUNDAY	AVERAGE WEEKDAY	AVERAGE SATURDAY	AVERAGE DAILY	COMPUTED VOLUME	PERCENT GAIN	PERCENT LOSS
61	357027	2010	August	6	2066	2726	2904	2643	81924		

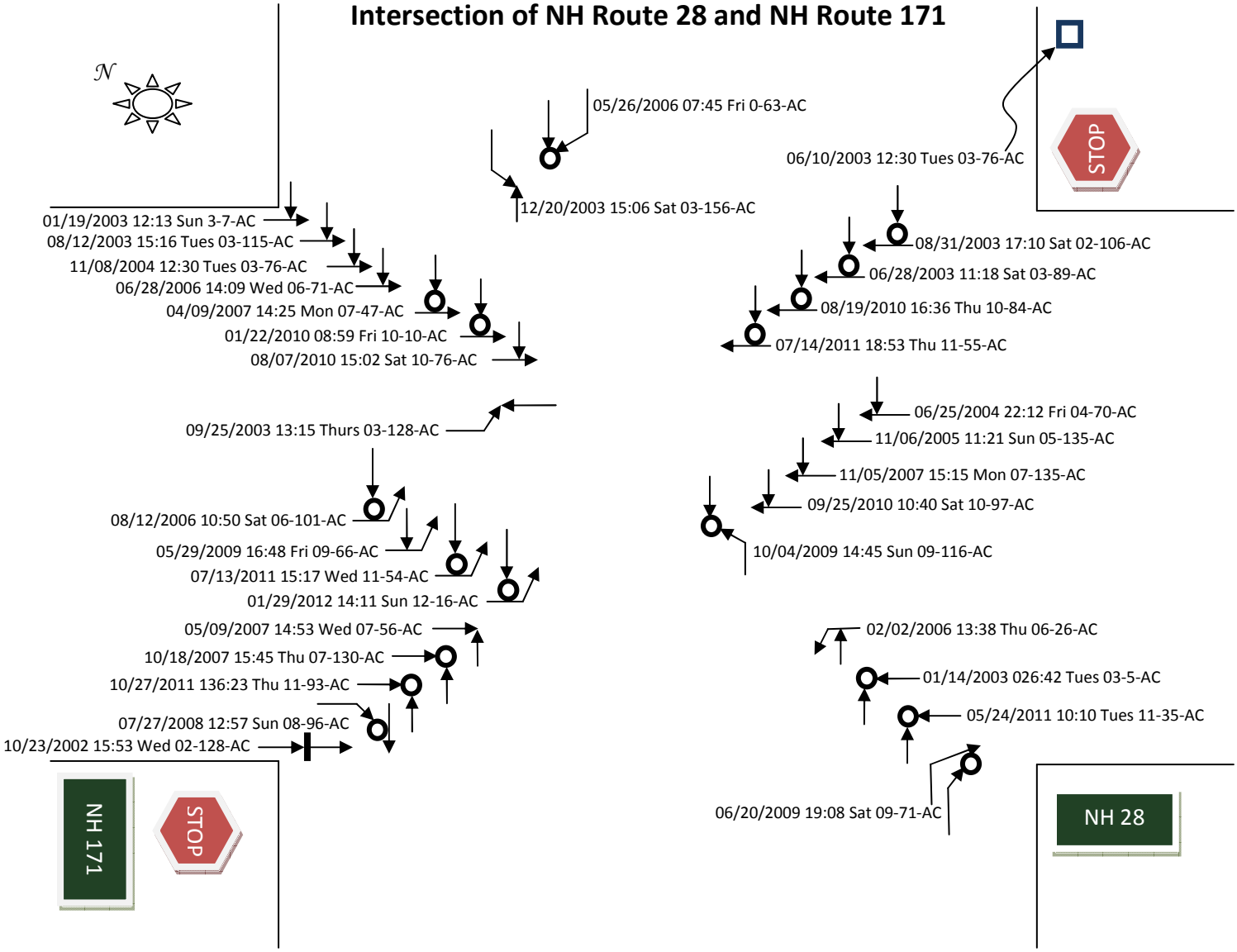
PEAK HOUR VOLUMES:

	AVERAGE AM:	AVERAGE MIDDAY:	AVERAGE PM:
SUNDAY	153	187	185
WEEKDAY	192	224	252
SATURDAY	154	275	268

AM - 6 AM TO 10 AM
MIDDAY - 10 AM TO 2 PM
PM - 2 PM TO 8 PM

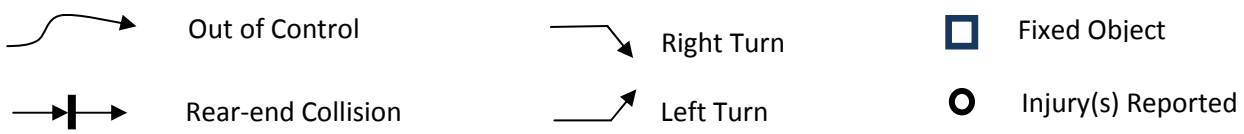
Appendix B – Collision Diagrams

Intersection of NH Route 28 and NH Route 171



Town: Ossipee
Prepared by: Lakes Region Planning Commission
Date: April 17, 2012
Period: February 2002 - January 2012
Information Reported by Accident: Date – Time – Day of Week – Accident Report Number

SYMBOLS



Appendix C – RSA Presentation

ROAD SAFETY AUDIT

INTERSECTIONS OF:
NH 28 / NH 171

TOWN OF OSSIPEE

CHA

Introductions

- Presenters
  - Stuart Thompson – NHDOT
  - Nicolas Bosonetto– CHA
- Stakeholders
  - Town of Ossipee
  - Lakes Region RPC
  - NHDOT

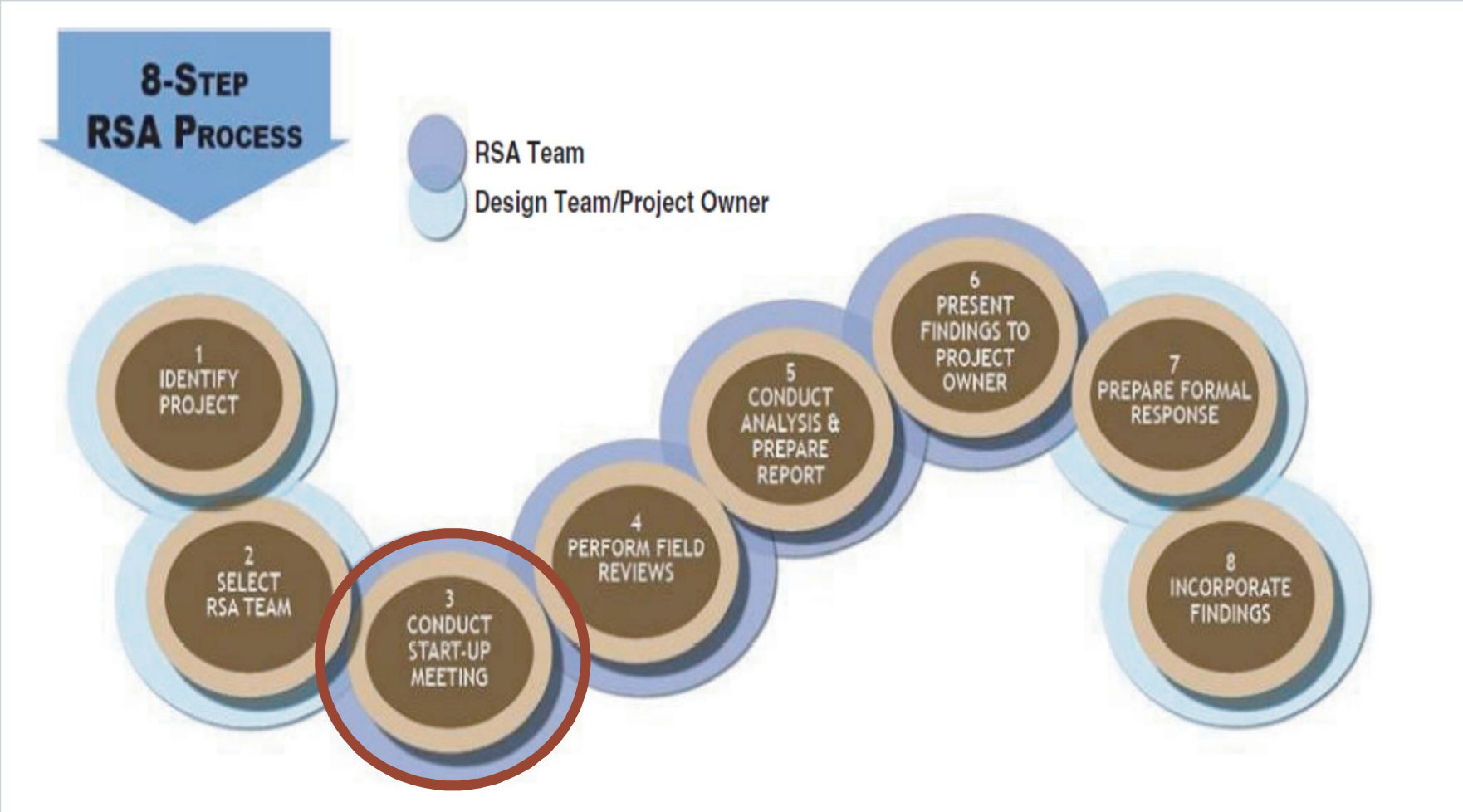
Agenda

Time	Item
9:30	Welcome and Introductions
9:30-9:45	Presentation on the RSA process, scope and objectives
9:45-10:00	Background information on project area
10:00-10:30	Group discussion on safety issues and concerns
10:30-11:00	Field Review at project site
11:00-11:45	Return to meeting room – discussion of site observations
11:45-12:00	Discussion of next steps and conclusion of meeting

Road Safety Audit

- A Road Safety Audit (RSA) is a formal safety performance evaluation.
- Conducted by independent, multi-disciplinary RSA Team.
- Goal is to enhance safety for all road users, under all weather conditions.
- RSAs follow an eight step process.
- Outcome is a report identifying short, medium and long term alternatives.

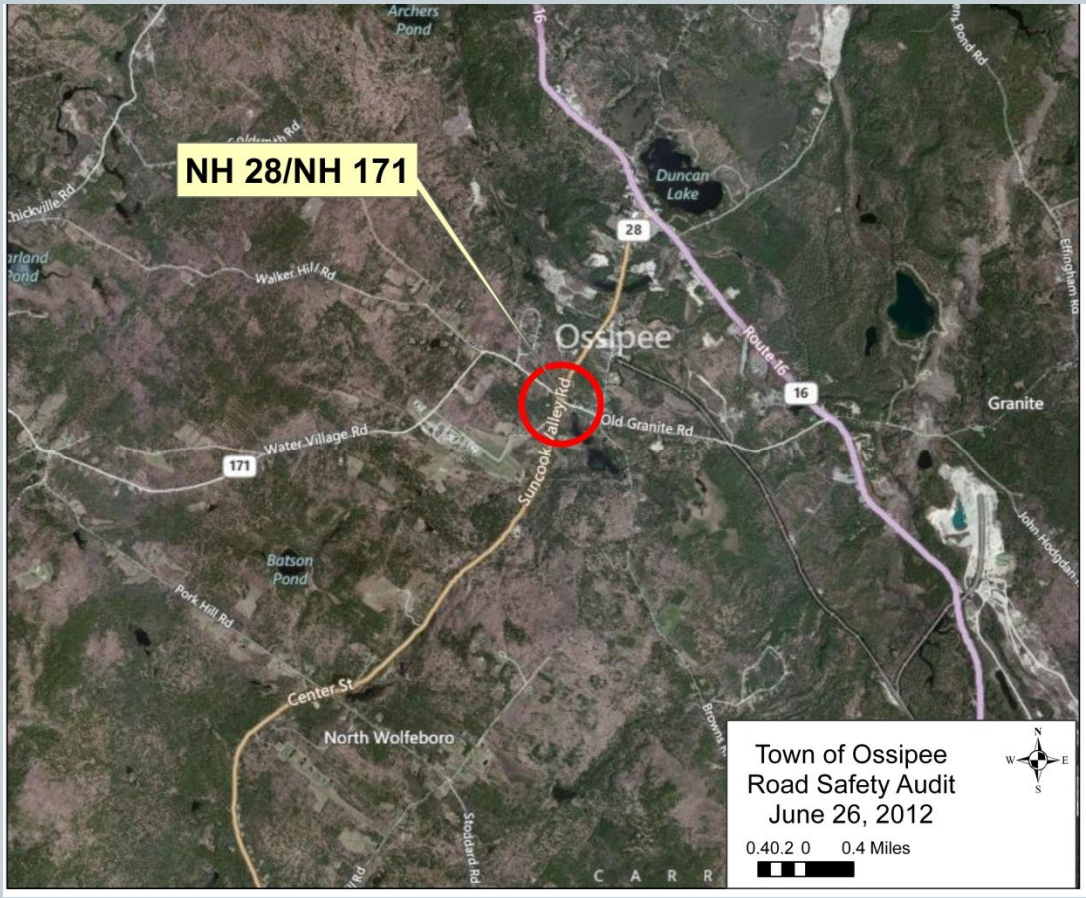
Step 3 – Conduct Start-Up Meeting



Step 3 – Conduct Start-Up Meeting

- Goals:
  - Review scope of project
  - Review project accident data
  - Review project traffic data
  - Gather institutional knowledge from Stakeholders

Project Overview



NH 28/ US 171

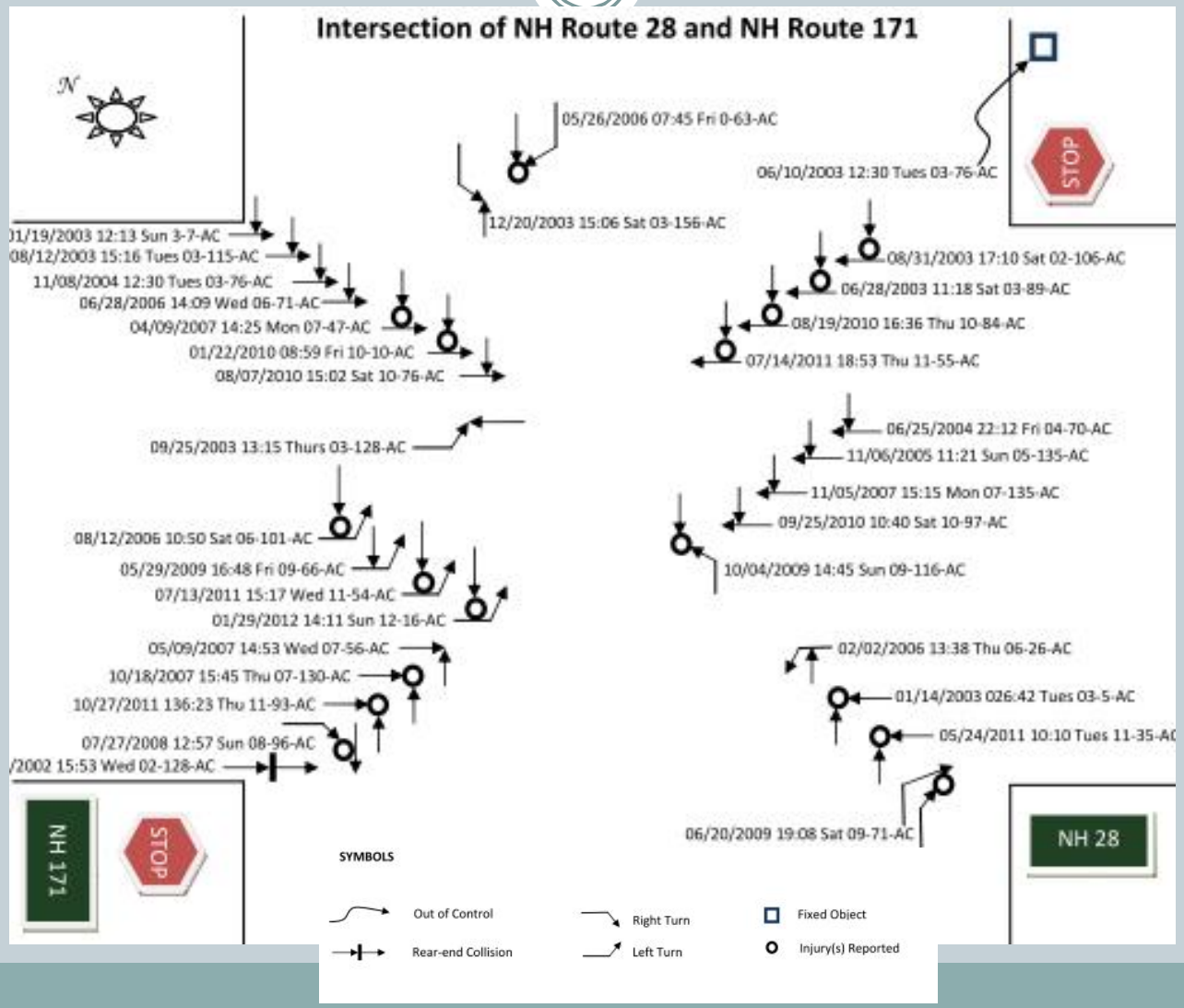
Water Village Rd
Medical Clinic
County Complex
Dirt Road Access
Suncook Valley Rd
Courthouse Sq
Historic Village
Old Route 28
County Farm Rd
28
171
Town of Ossipee
Road Safety Audit
June 26, 2012
500 250 0 500 Feet

Traffic Counts – NH 28 / NH 171

- Annual Average Daily Traffic (ADT)
  - NH 28 NB – 3,398 vehicles per day in 2010 (station 357026)
  - NH 28 SB - 2,643 vehicles per day in 2010 (station 357027)
  - NH 171 – 1,028 vehicles per day in 2011 (station 357058)
- Turning Movement Counts 10/10/2011
  - Moring Peak Hour 8:00-9:00 w/514 vehicles
  - Afternoon Peak Hour 3:00 – 4:00 w/633 vehicles
  - 55% of traffic is NH 28 through traffic
  - 12% of traffic is NH 28 traffic using slip ramps
  - 3% of traffic is NH 28 traffic turning left
  - 29% of traffic is NH 171 traffic going through or turning left

CHA

NH 28 / NH 171
Collision Diagram 2002 - 2012

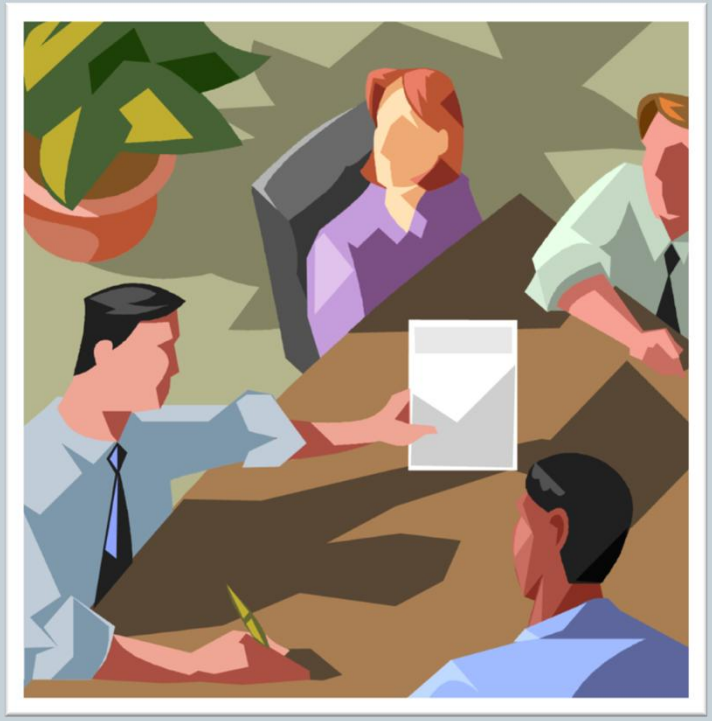


NH 28 / NH 171
Collision Diagram 2002 - 2012

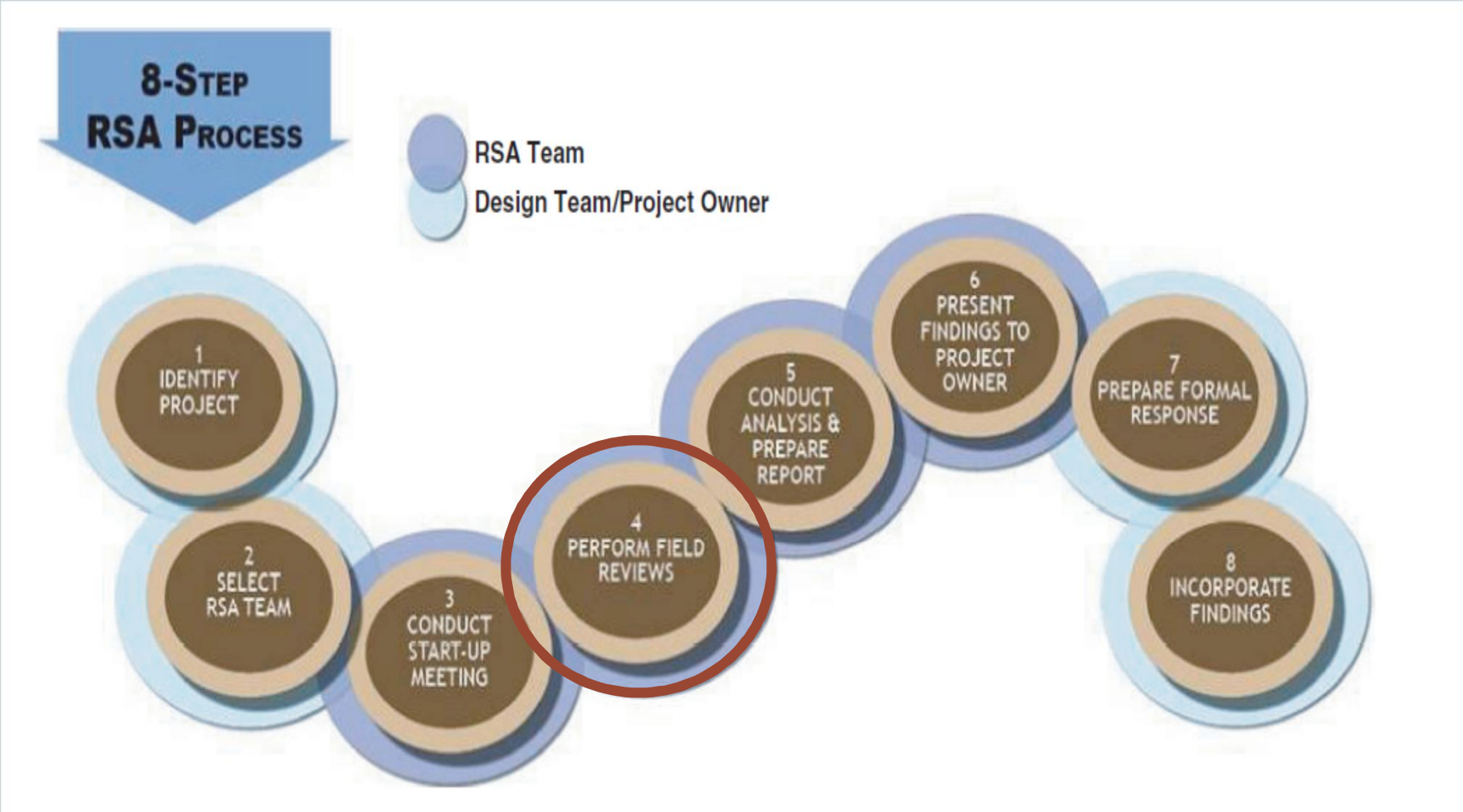
- 33 total crashes (avg. 3.2 crashess per year)
  - 2003 -11 crashes
  - 2006 – 4 crashes
  - 2007 – 4 crashes
  - 2010 – 6 crashes
  - 2011 – 4 crashes
- 17 injury, 0 fatalities, 16 Property Damage Only (PDO)
- 91% of crashes during daylight
- 76% crashes right angle crashes
- 9% crashes involve rear-end/sideswipe collisions
- No crashes involving peds/bikes
- 76% crashes are NH 171 traffic failure to yield
- 14% crashes are between NH 28 traffic

CHA

Institutional Knowledge from Stakeholders



Step 4 – Field Review



CHA

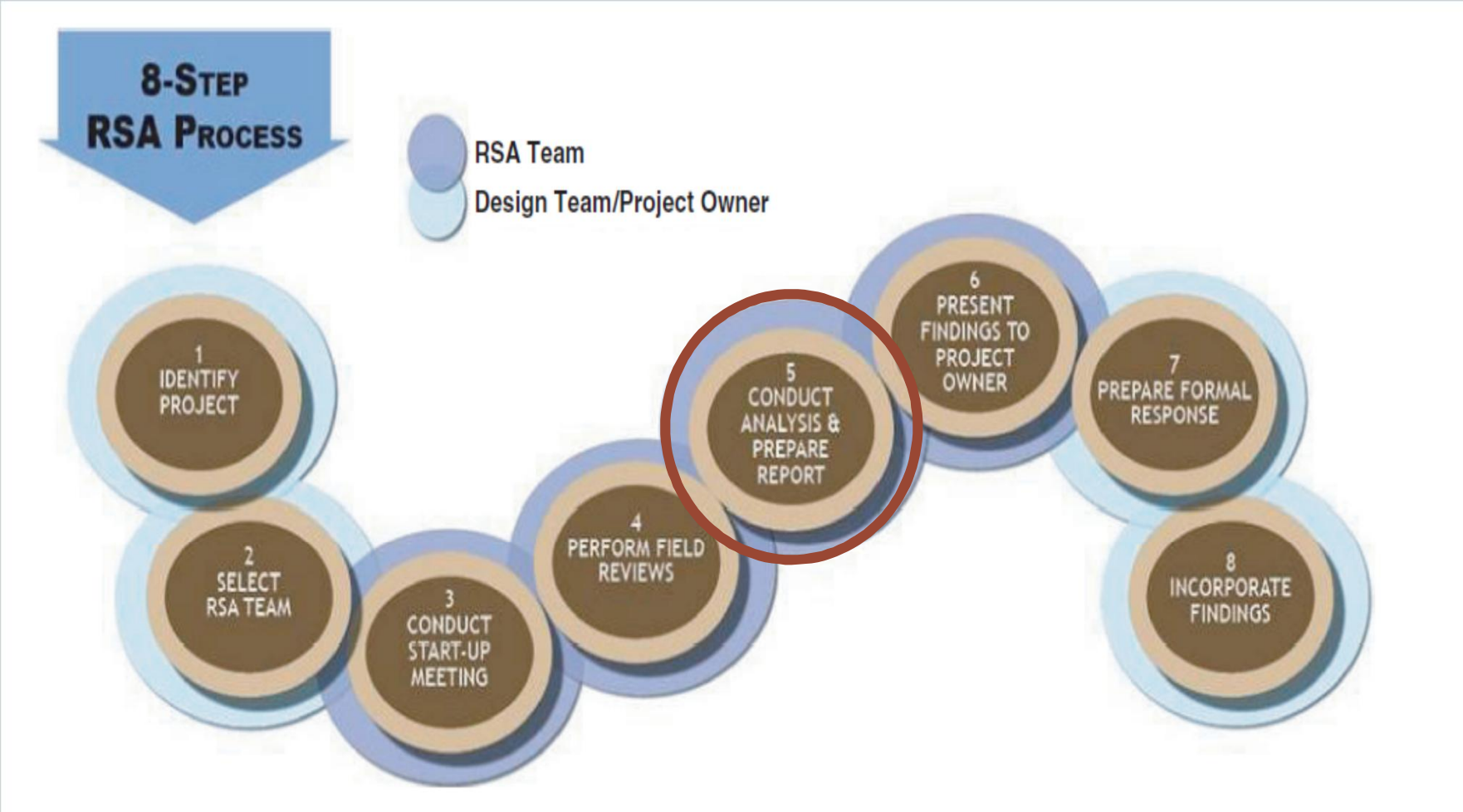
Step 4 – Field Review

- Goals
  - Observe existing conditions
  - Identify/verify safety concerns
- Things to consider - GORE
  - Geometric attributes and condition of roadway
  - Operations - Traffic movements, signs, pavement markings, lighting
  - Road Users - All possible users and their needs
  - Environment - effect of weather, vegetation and flooding

Step 4 - Field Review

- Safety First
  - Recommend wearing safety vest
  - Be careful of traffic, roadside ditches, culverts, manholes and vegetation
  - Do not block sight lines of vehicles attempting to use intersection
  - Be careful of rocks kicked up by passing trucks
- Logistics
  - Carpooling
  - Return to Meeting Room

Step 5 – Conduct Analysis



Step 5 – Conduct Analysis

1. Identify Safety Risks
   - Use checklist and notes from discussions & field visit

Things to consider - GORE

- Geometric attributes and condition of roadway
- Operations - Traffic movements, signs, pavement markings, lighting
- Road Users - All possible users and their needs
- Environment - effect of weather, vegetation and flooding

Step 5 – Conduct Analysis

2. Prioritize Risks
   - Categorize each safety risk from low severity to extreme severity

TYPICAL CRASHES EXPECTED (per RSA item)	EXPECTED CRASH SEVERITY	SEVERITY RATING
crashes involving high speeds or heavy vehicles, pedestrians, or bicycles	probable fatality or incapacitating injury	*Extreme*
crashes involving medium to high speed; head-on, crossing, or off-road crashes	moderate to severe injury	*High*
crashes involving medium to low speeds; left-turn and right-turn crashes	minor to moderate injury	*Moderate*
crashes involving low to medium speeds; rear-end or sideswipe crashes	property damage only or minor injury	*Low*

Step 5 – Conduct Analysis

3. Brainstorm possible solutions
   - All suggestions are welcomed
   - Use team members as resources for engineering, enforcement, policy, and education knowledge
   - Identify solutions as short, medium, and long term implementation
     - Short term solutions could feasibly be accomplished within six months,
     - Medium term within six months to two years,
     - Long term solutions would be those that would take more than two years to implement.
   - Identify Stakeholder responsible for each solution

CHA

Step 5 –Report

- CHA will prepare report based on today's meeting
- Draft Report will be circulated to RSA Team
- Final Report will be submitted to NHDOT
- NHDOT will then complete process
  - Will present final report to project owners
  - Document response
  - Implement the recommendations

CHA

Thank you

- Questions/Comments

Nicolas Bosonetto – nbosonetto@chacompanies.com

Appendix D – RSA Sign-in Sheet

Road Safety Audit - Town of Ossipee

June 26, 2012

Name: Last	First	Title	Organization	Email
RILEY	ADAM	FIRE CHIEF	OSSIPEE CORNER FD	ocfd5@roadrunner.com
ELDRIDGE	JAMES	LIEUTENANT OSSIPEE PD	OSSIPEE POLICE	JELDRIDGE@OSSIPEE.ORG
IZARD	MICHAEL	PRINCIPAL PLANNER	LRPC	mizard@lakesrpc.org
Thompson	Stuart	State Highway Safety Engineer	NHDOT	gthompson@dot.state.nh.us
MORRILL	MARK	NHDOT - DISTRICT 3 ENGINEER	NHDOT	mmorrill@dot.state.nh.us
HARRIMAN	BRAD	PUBLIC WORKS DIRECTOR - OSSIPEE	TOWN OF OSSIPEE	BHARRIMAN@OSSIPEE.ORG.
Maloney	Kathleen	Chm Selectboard	Town of Ossipee	Kmaloneythomas@aim.com
King	Robert	Sergeant - Ossipee Police	Ossipee Police	rking@ossipee.org
SPAULDING	NANCY	[redacted], PRELIMINARY DESIGN ENG.	NHDOT	nspaulding@dot.state.nh.us
MERROW	HARRY	Selectman	Ossipee	hcmerrow@myfairpoint.net