TECHNICAL MEMORANDUM

DIAGNOSTIC STUDIES OF HIGHWAY VISUAL COMMUNICATION SYSTEMS

HPR-2(108)

STUDY SITE NO. 10

ALASKA STATE HIGHWAY 1 - SEWARD HIGHWAY - ANCHORAGE, ALASKA

TM2(108-10)

INTRODUCTION

The "Diagnostic Studies of Highway Visual Communication Systems" research project has been designed to: (1) review the current practices in visual communications with the automobile driver using a multi-discipline team approach; (2) identify the deficiencies in these practices and (3) recommend changes in the existing standards. Pilot studies were conducted in three states (Arkansas, California, and Maryland) in order to develop the diagnostic study techniques and to acquaint the members of the Project Policy Committee with these procedures. This memorandum is a detailed report on the results of the diagnostic team review of sites within these states. The opinions expressed are those of the diagnostic team and not the recommendations of the research staff. The results of pilot studies and the improvements recommended by the staff will be combined as an interim report to be published in the near future.

DESCRIPTION OF STUDY PROCEDURES

The diagnostic evaluation of the study site was conducted using both the driver interview and open-end questionnaire techniques. Each member is asked to drive a route following the instructions of the interviewer. The route included short sections and adjacent facilities as illustrated in Figure 1. The driver was asked to comment on the roadway section as he drove, and these comments were recorded. The interviewer asked questions only as necessary to keep the conversation productive. At the conclusion of each driving phase (night and day), the subject was asked to complete a questionnaire. The interviews and the comments on the questionnaire are the basis of the material presented in this memorandum.

STUDY SITE CHARACTERISTICS

GENERAL CHARACTERISTICS

A five and one-half mile section of Alaska State Highway 1, the Seward Highway, just south of the city of Anchorage, Alaska, was selected as one of the two-lane study sites characteristic of two-lane highways throughout the country. The study section begins at O'Malley Road at the south edge of the city of Anchorage and continues to Potter, Alaska. The field studies on this site were conducted during the week of June 9-13, 1969. The weather conditions throughout the study period were clear and mild.

The diagnostic team assembled for this study was composed of individuals with the following occupations:

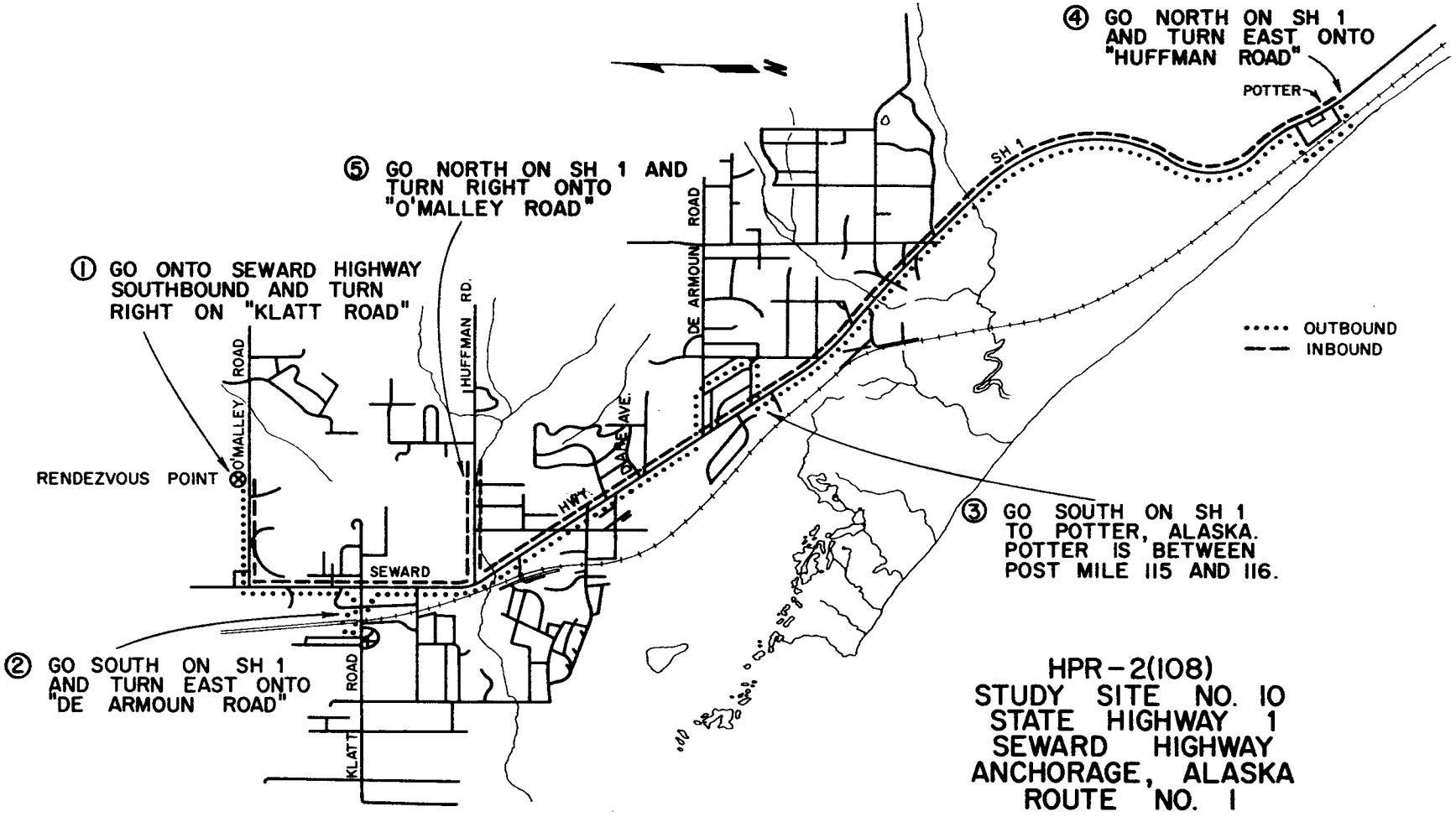
A representative of the Alaskan State Troopers
A professional truck driver
A research engineer with the U.S. Bureau of Public Roads
A school teacher
A draftsman for the Alaska Department of Highways (This individual was a college student - just hired for summers. His first day on the job was on this study).
A traffic engineer from the Maryland State Roads Commission
A planning engineer from the Alaska Department of Highways.

This team composition represents a rather broad cross section of driver capabilities and technical backgrounds and thus, seems to offer interdisciplinary nature required of a diagnostic team.

This roadway could best be classified as a rural two-lane highway at the periphery of an urban area. The study section was 5.43 miles in length and contained six intersecting roadways that could be classified as major streets or major roads. There were two sections of strip commercial development and some rather extensive residential areas just off of the facility. This basically two-lane highway section had gravel shoulders of varying widths throughout the study section. In general, the shoulder width was approximately six feet, but at points it was in excess of ten feet and at others, narrower than two feet. All of the intersections are at-grade, and there are several bridges over minor drainages. The primary control of the intersecting roadways is stop control; however, there are several minor roadways that have no control at all. The access to abutting properties is uncontrolled, and many of the commercial developments have very extensive driveways. A strip map of the study section is presented in Figures 1 and 2.

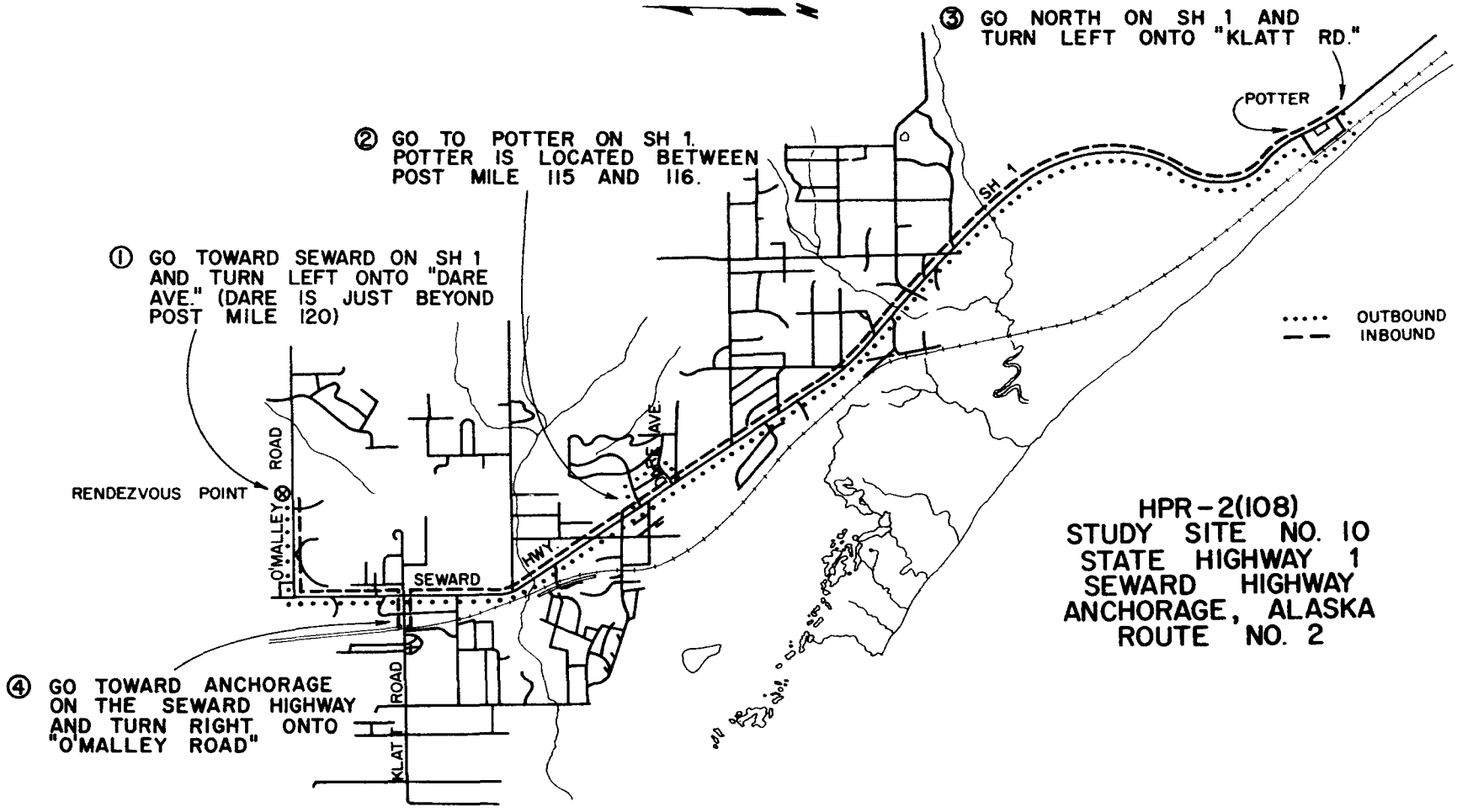
DESCRIPTION OF TRAFFIC CONTROL

Markings--The pavement markings throughout the study section could be considered typical of a two-lane rural highway. The normal centerlines with appropriate no-passing zones were in place, and edge lines were used throughout the study section. At points the edge lines overlapped the various paint applications, presenting a line from four to eight inches wide, and sometimes the edge lines actually appeared as two separate lines. There were no word messages on the pavement or other supplementary pavement markings.



Strip Map of Study Site 10 Indicating Driving Route 1

Figure 1.



Strip Map of Study Site 10 Indicating Driving Route 2

Figure 2

Signing--The major intersecting roadways in the study section were controlled by two-way "STOP" signs; however, there were several minor intersecting roadways that had no control at all. The regulatory information along the study section was rather sparce and consisted primarily of the posted speed limit. The directional signing in all cases was placed on the right and was the combination of both route markers and in one case at least, destination names. The route markers were in some cases combined on one standard with the posted speed limit.

There is a large number of warning signs, particularly for intersections, curves, and a couple of special applications with "MOOSE CROSSING NEXT 8 MILES" and "FIRE STATION AHEAD."

There was also one general information sign which read "PHONE 1300 FEET."

TRAFFIC CHARACTERISTICS

The traffic volumes within the study section varied from 1600 vehicles per day near Rabbit Creek Rd. to 4700 vehicles per day near O'Malley Rd. There was a considerable volume of campers and light trucks using this roadway as the primary roadway from Anchorage south toward Seward. Approximately one-third of the traffic entering the north end of the study section is through traffic with the remainder being destined to one of the local roads connecting within the study section.

The posted speed throughout the study section was 50 mph. The running speed generally conformed to the 50 mph limit with a very small proportion exceeding the value.

ACCIDENT CHARACTERISTICS

The accidents within the various elements of the study section were varied both in number and severity. The two and one-half mile section between Potter and Rabit Creek Rd. had a total of seven accidents of which five resulted in personal injuries. This is an apparent accident rate of 4.8 accidents per million vehicle miles. In the study section between Rabiit Creek Rd. and D'Armoun Rd., a length of 1.1 miles, there were 16 accidents of which five resulted in personal injury and an apparent accident rate of 16.8 accidents per million vehicle miles. In the section between D'Armoun Rd. and Huffman, a distance of 1.2 miles, there were six accidents of which two resulted in personal injury, and an apparent accident rate of 4.1 accidents per million vehicle miles. Between Huffman Rd. and O'Malley Rd. at the north end of the study section, there were thirteen accidents of which six resulted in personal injury. This is an apparent accident rate of 7.6 accidents per million vehicle miles. There were no fatalities recorded for the year in the study section.

DIAGNOSTIC TEAM REVIEW

STUDY SITE NO. 10; ALASKA STATE HIGHWAY 1; JUST SOUTH OF ANCHORAGE, ALASKA

SUGGESTED DESIGN IMPROVEMENTS

The diagnostic team members considered the possibility of increasing the lane width to 12 feet but felt that without adequate shoulders an increase in the lane width would not be desirable. There was some consideration of the relatively rough pavement surface, and it was suggested by one of the team members that some consideration should be given to resurfacing portions, if not all of the study section.

There was a consensus of the team that the shoulders were not of sufficient width, but the existing subgrade would not permit much wider shoulders to be used. The paving of the shoulders was suggested as a means of reducing the problem of interfacing between the through lanes and the shoulder area.

There was a suggestion by several of the team members that a concrete or asphalt apron should be added to the gravel roads intersecting the main roadway. It was pointed out by several of the team members that the asphalt surface or concrete surface in the winter with the snow and ice is much slicker than the gravel surface and that in the long run they thought the gravel would be better, although there was some problem of friction in the dry summer weather.

There was an indication that the team favored a major redesign of the mail service facilities in order to remove the mailboxes somewhat further from the through traffic lanes. It was also suggested that the state should have a standard mailbox installation in order to minimize the hazard to the public of the mailboxes on the highway right-of-way.

The lack of sight distance just south of the Rabbit Creek Rd. intersection was noted as being one of the critical problems in this area, and it was suggested that some form of control device be added to advise the motorist of a blind hill until it is feasible to reduce the vertical curvature at that point to increase the sight distance.

There was a consensus of opinion of the diagnostic team that some action should be taken to improve the sight distance at local intersecting roadways. Several of the intersections were blocked with vegetation or mailboxes which made it difficult for the entering driver to get a proper perspective of the roadway section.

There was a general consensus of the team that with a narrow shoulder and very sharp side slopes guardrail installation would be desirable. This was particularly true in the area just south of Rabbit Creek Rd. and the Potter turnaround point.

SUGGESTED IMPROVEMENTS IN THE SIGNING

The primary concern of the diagnostic team regarding signing dealt with the uncontrolled intersections located along the study section. There was a general consensus that these intersections should definitely have some type of control, and there was the general feeling that stop control would be appropriate.

There was a considerable discussion among the team members of the value of the "MOOSE CROSSING" warning sign used within the study section. Several of the team members thought that this was a good sign to remind the driver to be alert for a moose on the roadway while others felt that it was a superfluous sign and should be removed. The warning sign "FIRE STATION AHEAD" was considered by at least one of the team members to be unnecessary and by a majority of the team as being ineffective in warning the driver of an emergency vehicle entering the roadway. It was suggested that this sign should be supplemented with a flashing amber beacon which would be activated whenever an emergency vehicle was about to enter the roadway.

The use of the "CROSSWALK AHEAD" warning sign was questioned at the intersection of Dare Ave. and State Route 1. It was the general consensus of the diagnostic team that this sign would probably be effective only if there was a pedestrian in or about to enter the crosswalk, and there was a general feeling that probably a better treatment for this area would be a reduction in the posted speed to the suburban type development that this represents.

The lack of advance street name information is considered to be a primary problem for the driver on the study section. The opinion of the diagnostic team that supplementary name plates added below the standard intersection warning sign would be effective in conveying to the driver the name of the intersecting roadway. When the advance warning sign is not used, it was suggested that an advance street name sign be placed at approximately the same distance that the warning sign is placed in order to alert the driver of the intersecting roadway ahead. The team felt that this treatment should be the standard practice for everything except private driveways and should be in place for both approaches to the intersecting roadways.

One of the team members felt that it was absolutely essential that cardinal directions be added to the double-headed arrows in place of the head-on position for the T-intersections. He also suggested that when feasible the route numbers or route name should be placed with the cardinal direction plate. The information sign "PHONE 1300 FEET" is real good, and everybody seems to like them. When they are used, however, there should be a supplementary sign at the actual location of the phone provided it is not obvious to the driver. In general the team felt that there should be some regulation of the commercial signing to keep it from interferring with the traffic control devices.

SUGGESTIONS ON PAVEMENT MARKINGS

The edge line used in the study section was considered desirable, and it was felt that all two-lane highways should be provided with an edge stripe. It was also the opinion of the diagnostic team that there should be openings in the edge line for public drives to and from private establishments.

There was some feeling that the no-passing zones were a bit short; however, there was no consensus of opinion on this point. The lack of an adequate centerline in the area between Rabbit Creek Rd. and Potter Station was indeed a definite drawback. It was felt that some effort should be made to use a more positive form of centerline identification in this area.

It was also felt that stop bars should be used on all the intersecting roadways which are paved and for which the "STOP" signs have to be placed some distance in advance of the expected stopping position. This would inform the driver where he could stop safely and still have adequate sight distance along the roadway.

SUGGESTIONS ON DELINEATION

In reviewing the study section for adequate delineation the diagnostic team thought that there were two areas in which it might be desirable to add post-mounted delineators. The first is in the series of curves between Rabbit Creek Rd. and Potter Station which, because of their location within a heavily forested area, were very dark. Thus, it was felt desirable to have delineators on the outside of the curves throughout this section. The other point of discussion regarding delineators dealt with the identification of private driveways into the abutting properties during the winter months. It was a general consensus that it was absolutely essential for these drives to be identified, but there was mixed opinion as to whether this was the responsibility of the property owner or the responsibility of the state. There was no consensus of opinion on the responsibility question; however, it was felt desirable that all the drives should be identified with a common delineator system.

APPENDIX "A"

DESCRIPTION OF THE STUDY PROCEDURES

The diagnostic evaluation of a study is conducted in four separate phases:

a. Preliminary session
b. Day driving phase
c. Night driving phase
d. Diagnostic team review

The preliminary session is designed to introduce the interdiscipline team to objectives of the study and to explain the study procedures. The diagnostic questionnaire is presented to the team and discussed with them. The explanation of the questionnaire concentrates on the fact that it is not designed to obtain a particular response from them, but rather, it is designed to direct their thinking into a particular area and thus elicit comments which the individual might care to make.

The day phase of the on-site review begins on the afternoon of the first day of the study. The diagnostic team members are transported to the rendezvous point at one end of the study section. Two cars are used in the driver interviews and, upon arrival at the study site, the number one drivers begin their driving runs with the other team members remaining in a car stationed at the rendezvous point. The driver is given instructions well in advance of the required maneuver, and his comments regarding the communication systems provided are recorded on a portable tape recorder. The comments are tied to the roadway through reference markers located at the roadside. The marker numbers are read and recorded on tape as each is passed. After completion of the driving run, the team member moves to an observer position and the second driver begins his driving run. A different route is driven by the second driver. Errors made during the driving phase are corrected as soon as it is practical to do so. When both the driver and observer runs are completed, the team member is asked to complete the diagnostic questionnaire on the daylight phase. The process is repeated until all team members have served as a driver and as an observer.

The night phase is conducted in the same manner as the day phase and is held on the evening of the first day of the study.

The morning of the second day of the study is devoted to a team review of the study site. Problem areas are identified, and suggestions regarding possible solutions are discussed. The team is not asked for a consensus of opinion on the improvements which should be made on the study site. Rather, all ideas are explored regardless of how many or how few of the team members might support them.

The comments made on the diagnostic questionnaire and the summaries of the driver interviews are the basis of the Technical Memorandum on the study site which is the formal report of the opinions expressed by the team.

APPENDIX "B"

SUMMARY OF THE DIAGNOSTIC QUESTIONNAIRES

Study Site No. 10; State Highway 1; Anchorage, Alaska

The following is a detailed presentation of the comments made by the diagnostic team members on the diagnostic questionnaires, concerning daylight conditions.

DAY PHASE

Question: Did you, as a driver, lose visual contact with the roadway surface at a distance less than you would desire at any point along the vehicle's projected travel path?

Yes	No	Comments
X		The road disappears at the approach of the rise.
X		There were two intersections that had hill crests which blocked the view on the main road, making entrance difficult. Also, there were some blind corners on secondary roadways.
X		On the vertical curves. The problem was not severe enough to make me uncomfortable, but it may have been, if I had been anticipating a passing maneuver.
X		Some of the fills were probably too steep. Speeders would have had more of a problem with this.
X		At one or two points where vertical and horizontal curves coincide. It's obvious that the situation exists, and I felt uncomfortable, since it is difficult to subconsciously "guess" how the road will proceed. It would also seem difficult to relieve this problem with conventional road signs.
X		This section of road has many horizontal curves and sharp vertical curves. I would hesitate to pass, even in the passing zones during rush hours.
X		Sight is obstructed on curves by woods or by cut slopes.

Question: How would you evaluate the importance of being able to see the roadway surface in the driving task? (Answers: A--Of Little Importance; B--Of Some Importance; C--Relatively Important; D--Critical Problem)

A	B	C	D	Comments
			X	You can't tell whether the road goes straight, left, or right.
		X		A necessary safety factor with reference to other traffic.
			X	The driver's view of the road is most important. Much of the signing is merely to supplement this view of the roadway.
			X	One needs to be able to see the roadway in order to anticipate steering corrections and hazards requiring deceleration. Surface conditions often dictate changes in safe speed, such as icy patches on a fairly dry road.
	X			For most fills on relatively straight roads, I have an intuitive feeling for the situation ahead; therefore, I don't feel uncomfortable or distracted, except for sharp vertical or horizontal curves. I would probably be more likely to overlook conventional warning signs when distracted in these situations.
			X	The harder it is to see the roadway, the more tense I become when driving.
		X		This is critical if the edge or the centerline marking is absent.

Question: Does the obscured visibility along the roadway create any noticeable degree of erratic behavior on the part of the driver?

Yes	No	Comments
	X	
X		It requires a greater degree of concentration.
	X	The driver felt reasonably comfortable driving this road at 50 mph.
X		I think it tends to make me slow down and drive closer to the center stripe.
	X	However, in heavier traffic, the section of highway with multiple curves would probably be very annoying.

Yes	No	Comments
X		I tend to want to slow down when approaching other vehicles or side roads.
X		Normally, it was not a problem, but it caused concern in some specific locations.

If "Yes", is this the result of trucks or other slow-moving vehicles in the traffic stream?

No, due to design and construction of the road, as well as proximity of the trees, etc., to the roadway.

Partly.

Partly. Also, it is partly due to the roughness and lack of shoulders.

No.

Question: Does the driver appear to have difficulty in maintaining the vehicle within the lane (i.e., does he tend to run off onto the shoulder or over the centerline)? (Answers: A--Yes; B--Not to Any Marked Degree)

A	B	Comments
X		From low spots on edge of the pavement.
X		Due to rough, uneven, patched conditions of the pavement and gravel surfaces.
	X	I should hope not. Little allowance is made for error. The lanes could be wider. They appear to be 10' or 11'. The narrow shoulders and steep side slopes make any straying from the roadway critical.
X		Again, I'd probably drive too close to the center-line because of the narrow roadway and the narrow, steep shoulders.
	X	Although a number of oncoming vehicles appeared to be overlapping the shoulder line (1 to 2 feet of pavement beyond the line).
X		A little bit on the inside of the curves.
	X	Edge striping was applied along the section.

Question: Is the through lane clearly identified from the shoulder?

Yes	No	Comments
X		
X		On the pavement only. On gravel roads--no.
X		Edge lines are present throughout. There is not too much contrast in color between the shoulder and the roadway.
X		It is on most of the route, but the white stripe is worn on part of it.
X		Although it appears markings were intentionally placed too far into the lane to cover up for very narrow shoulders, which are still too narrow.
X		Edge striping is in good condition in most areas.
X		Edge striping was in evidence, but the centerline was obliterated over much of the route.

If "Yes", how is this accomplished; if "No", how could it best be accomplished?

It is marked with a solid white line.

It is accomplished with the use of a white line defining the road's edge. On the gravel roads, use design construction, with respect to the shoulders and the slopes.

Edge lines are present throughout. There is not too much contrast in color between the shoulder and the roadway.

White Stripe. (Orange stripe for snow conditions?)

White line.

Edge Striping.

Edge striping was in evidence. The centerline paint should be applied.

Question: Does there appear to be any substantial amount of traffic running off onto the shoulders?

Yes	No	Comments
X		It is a rough, narrow pavement.
X		This occurs on corners and on straightaways, as a result of the surface conditions as mentioned earlier.
	X	If there were, it would probably be recorded in the accident statistics, since very little room is allowed for recovery.
X		This is especially bad near commercial establishments where people often drive off the pavement, causing chuck holes to appear.
	X	Not accidently, but necessarily due to the narrow lanes.
	X	There is not enough shoulder to park on. One must wait for a business or a side road to find room to get off the highway.
	X	The shoulders are very narrow. Edge striping helps greatly.

Question: Would you hesitate to pull off onto the shoulder in wet weather?

Yes	No	Comments
X		The shoulders are soft.
X		The shoulders are narrow; the gravel is loose, which is hazardous during "spring break up".
X		I would absolutely refuse.
X		In many spots, I wouldn't want to in any weather because of the narrow width.
X		Even under normal conditions. Shoulders are too narrow; the outside edge is not well defined; the slope of the shoulder should be more consistent rather than rounded.
	X	If there were room, I wouldn't.
	X	It appears to be sound.

Question: Does there appear to be a difference of elevation between the through lane and the shoulder?

Yes	No	Comments
X		The shoulders are not kept graded up.
X		There is a slight crown in the roadway, as well as dips due to frost heaves.
	X	None was noticed.
X		In many parts, the drop appears to be the depth of the pavement; on some parts, it looks good (no noticeable difference).
X		Outside edge is not well defined. It fades off into the side slope.
	X	However, the transition is too great to take at a high speed.
X		In some locations the embankment material in the shoulder is lower than the top of the pavement.

Question: Do fixed objects (guardrail, sign post, etc.) along the roadside create a tendency to drive nearer the certerline?

Yes	No	Comments
	X	
X		It could to a new driver or to a driver new to the area. This is due to the lanes being narrow in some areas.
	X	Sign posts do not constitute a hazard. Guardrails would be much more desirable unprotected, rather than steep side slopes, which apparently (from the worn centerline in sections) caused many drivers to move toward the center of the roadway.
	X	The mailboxes might be farther back, but that wouldn't be a problem with wider shoulders. At least one, on a 55 gallon steel drum, does not follow coded standards.
X		Projecting mailboxes along the road were consistently distracting. But if they were set back, the mail-man would have fun jumping ditches due to the narrowness of the shoulders.

Yes	No	Comments
X		Mailboxes are the biggest and closest roadside obstacle.

Question: Are the roadside hazards removed a sufficient distance from the through lanes to insure reasonable safety?

Yes	No	Comments
	X	Mailboxes are too close to the edge of the pavement.
X		However, they (mailboxes, business signs, etc.) could be further removed. Utilities should be buried, also.
	X	Most hazards are beyond the side slopes. Utility poles are generally well removed from the roadway. I would like to see the mailboxes moved back, however.
	X	The mailboxes are too close, if one had to swerve to the right. Signs are at an acceptable distance. Culverts on the side are too close, if one has to leave the road.
	X	At groupings of two, three, and four business establishments, signs, fences, etc., appear too close to the road, blocking the view of potential hazards, such as pedestrians and side traffic.
	X	Chances of not hitting something, if you went off the road with your car out of control are very slim.
	X	They would create a definite hazard to a vehicle, if it were forced to leave the roadway.

If "No", is the hazard visible for a sufficient distance to prevent the driver's being startled by it?

Yes	No	Comments
X		
X		There is sufficient distance. However, a driver new to the area would have to concentrate on this more so than a resident.

Yes	No	Comments
X		The mailbox itself does not constitute a hazard, but the mailman certainly would.
X		Some of the hazards (steep fills) are not too apparent, which is probably a good thing for jumpy drivers.
X		But the conditions are annoying.
	X	Particularly critical at sharp curves.

Question: In your opinion, what is the minimum safe distance to a fixed object (guardrail, sign post, etc.) on rural two-lane highways?

No. of Feet	Comments
3	Some guardrails are too close to the pavement.
10	At least the width of one vehicle, thus, allowing for emergency parking, etc.
15	From edge of the pavement. Twenty feet would be desirable in many cases. Sign supports should be of the breakaway design in either case.
8	Guardrails could be closer, but the signs should be at least a car's width away and should be the type that snaps off readily, if hit by a car.
30	
20	Should allow room for a vehicle to leave the roadway and come to a complete stop, if control is lost for any reason.

Question: Does the width of the through lanes require an excessive amount of driver concentration and thus increase the hazard of driving this section of roadway?

Yes	No	Comments
X		The pavement is too narrow.
X		This also is due to the pavement condition.
	X	"Excessive" is the key word here. It is felt that 12-foot lanes would be very desirable.
X		

Yes	No	Comments
X		Not with light traffic that existed, but with heavy traffic or trucks, etc., this would probably be very apparent.
X		I think the lanes seem extra narrow, due to the narrow shoulders.
X		Slightly. I would like the lanes one or two feet wider.

Question: Is there sufficient advance notification of intersecting roadways such that a smooth, natural turning maneuver is possible?

Yes	No	Comments
	X	Some roads are not marked.
	X	Some roads are not even posted.
	X	Intersection symbol signs could be placed slightly farther in advance, in some cases. Advance notice of intersecting roads of importance would be of benefit.
X		Good notice, but a hazard could be created by people looking for the right intersection.
	X	Frequently I encountered very minor roads coming from residential areas. If a warning sign were present, I was at times uncertain which road it was intended for until a more well-defined road appeared.
	X	Advance warning only on major roads. No advance notice of road name.
X		In some cases--however, this was lacking in others.

If "No", how could this best be accomplished?

Put signs.

Put up additional intersection warning signs with street names, or make visible postings of the streets.

Shoulder could also be widened and improved, approaching the intersecting roadway to serve as a deceleration lane.

Notification on the left, as well as the right, is good; I noticed this in Northern Minnesota.

Most of the above mentioned roads don't appear to be the result of overall planning. Since these areas appear to be new and growing, definite steps should be taken to eliminate them. Back route residential traffic of definite arterial roads to minimize intersections.

Approaches should not be placed near curves or obstructions, if possible. Advance warning signs should be a standard distance removed.

Question: Is the intersecting roadway clearly identified and outlined?

Yes	No	Comments
	X	
	X	In some cases the intersecting roadway is obscured, and in others they are not marked at all.
	X	The street signs are visible too late for maneuvering purposes at a rate of 50mph.
	X	Identification should probably be with advance notification; it should always appear on the right side, as well as along the left side.
	X	I was completely unfamiliar with these roads. There were no advance identification signs. Those at the intersections were too small, inconspicious, or nonstandard. Generally, I couldn't identify them until I was actually at the intersections.
	X	Road name signs are too small. Some of the roads Were not marked.
	X	The intersecting roadways are very poorly marked. The driver must slow down often when locating routes.

If "Yes", how is it accomplished; if "No", how could it best be accomplished?

		I would like to see the major roads designated on congruent 12" by 54" panels. The major intersections might be treated with congruent 16" by 96" panels. (There were no roads of this size intersecting on the study section.)
		A notification identification sign should probably be placed both left and right of the roadway opposite each other. Drivers following slow trucks, for example, may not be able to read the one on the right.
		Restrict arterial roads; use standard warning signs for intersections. In addition, have a white or green road identification sign directly below this on the same sign post. I feel this would be obvious to those looking for a particular road, yet not distracting to those who are not.
		Advisory signs giving the names of the intersecting routes should be posted before the intersections.

Question: Where advisory speeds (safe operating speeds) are posted, are they reasonable in light of the roadway and traffic conditions ahead?

Yes	No	Comments
X		
	X	There is unlimited access to roadside businesses. Driveways, etc., pose a problem in the area. The road is posted at 45 mph, but the general flow of traffic is 5 to 10 mph faster.
		None were present. The section could be driven comfortably at 50 mph throughout.
X		There could be more advisory speed signs though (i.e., for a crosswalk).
		I did not observe any advisory speed signs on this route.
X		No particular notice was taken of this item.

Question: Are the directional sign messages clear and concise so as to minimize the possibility of driver confusion?

Yes	No	Comments
	X	Some are shot full of holes.

Yes	No	Comments
	X	They are basic only and give no clue to the direction.
		None were present, but they could be used at more major intersections.
X		
	X	There are problems with the intersections, as mentioned.
	X	
	X	The directional signs contained insufficient information.

Question: Are the directional signs readable at a sufficient distance in advance of the required turn?

Yes	No	Comments
		Some are shot full of holes.
	X	Some were; some were not. They were quite inconsistent.
		Not applicable.
X		
	X	Yes, but only if the driver was aware that the road indicated was the correct road he intended to turn on.
X		In most cases.

Question: Did the trucks in the traffic stream block your view of the roadway ahead?

Yes	No	Comments
	X	None encountered. However, they would block the vision.
	X	Not applicable, but had any been present, they might well have.
X		

Yes	No	Comments
X		A trailer ahead occupied the entire lane and thus, obstructed the view of the road and the shoulder ahead. This, I felt was critical, since the lanes and shoulders were rather narrow. I had to cross the centerline to observe oncoming traffic before I could pass.
X		
	X	Few, if any, large trucks were encountered.

Question: In my opinion, the sight distance to right-of-way control devices ("STOP" signs, "YIELD" signs, signals, etc.) is:

/___/ ADEQUATE /___/ INADEQUATE

/___/ QUESTIONABLE /___/ CRITICAL

A	Q	I	C	Comments
X				
		X		Some devices were too far to one side. Others were not even posted.
X				Sight distance to "STOP" signs and "RAILROAD CROSSING" signs were adequate on signed roads. "STOP AHEAD" signs were used where visibility was limited.
	X			The above could have still larger lettering. I feel a "MOOSE CROSSING" sign at the top of a hill would better have been placed a short distance away on a relatively straight stretch.
X				Except for one "STOP" sign which appeared to be set off too far.
X				They are sometimes obscured by other roadside clutter.
	X			No specific problem was noted.

Question: Are the control devices located in positions where they are readily apparent to a reasonably alert driver? (Answers: A--Yes; B--Possibly; C--Poorly Located)

A	B	C	Comments
X			
	X		There is some confusion due to numerous signs at intersections.
X			Although some were missing at minor intersecting roads.
X			Not all drivers are alert constantly. In the case of a "STOP" sign and a "STOP AHEAD" sign, it would be good, if it were painted directly on the road.
X			Except for one "STOP" sign.
	X		They are sometimes obscured by other roadside clutter.
	X		Because of the encrouchments, etc., much driver attention was required to properly utilize these devices.

Question: Is there sufficient advance warning of traffic control devices which are not readily apparent?

Yes	No	Comments
X		No problem noted.
X		
X		"STOP" signs were posted in advance. However, no warning was given for "YIELD" signs or for areas where you should yield.
X		
	X	"STOP" signs and intersection signs are OK, but the identification signs are not. They have an inherent affect on "traffic control".
	X	Main side roads had advance warning signs. However, on most roads, I was uncertain that a major highway was being approached. They are sometimes obscured by other roadside clutter.

Question: Are the required speed changes accomplished in a manner which minimizes driver alarm and discourages rapid deceleration?

Yes	No	Comments
X		
X		The paved portion of the test was basically a constant speed.
X		No problem here.
X		
X		
	X	If you are looking for a side road name sign, you must be within 200 feet of it to read it.
X		Generally.

Question: Could the sign and/or the signal posts be relocated farther from the roadway, so as to reduce the associated accident potential and still retain an acceptable degree of effectiveness? (Answers: A--Yes; B--Possibly; C--Probably Not)

A	B	C	Comments
		X	
		X	One "STOP" sign was already too far removed for convenience and could not be easily spotted.
		X	No apparent problem.
X			Yes, if they were made larger.
X			Five to ten feet more.
	X		
X			Especially if sight obstructions were cleared.

Question: Where hazard warnings are provided can they easily be associated with the hazard involved? (Answers: A--Yes; B--In Some Cases; C--No)

A	B	C	Comments
X			
X			Where posted.

A	B	C	Comments
X			"CROSSWALK" sign, however was placed beyond the walk. "NEXT X MILES" addition to the "MOOSE CROSSING" signs are easily missed. They should be the same color.
	X		I can't remember any specific hazard warnings, but I feel there should have been some, such as "NARROW SHOULDERS" signs and reflectorized posts on sides of roads which one would avoid, if forced off the road.
	X		
	X		

Question: Are warnings provided for hazards which are obvious and for which little, if any, warning is actually required? (Answers: A--Yes; B--In a Few Cases; C--No)

A	B	C	Comments
X			
	X		There was one blind intersection that was not posted at all.
	X		"CROSSWALK" and "CROSSWALK AHEAD"
		X	Steep fills should be marked with reflectors, if not guardrails. The same applies to the narrow shoulders.
		X	
		X	
		X	There were none so noted.

Question: In your opinion, is there a question as to which roadway a right-of-way control device ("STOP" sign, "YIELD" sign, signal, etc.) applies?

Yes	No	Comments
X		Some "STOP" or "YIELD" signs are on the wrong road, when the sign is on the blind side of the driver.

Yes	No	Comments
	X	Due to paved and gravel surfaces. However, on gravel roads alone this would be a problem.
	X	
X		One intersection sign was questionable, but it was not a big problem.
	X	
	X	
	X	I had no difficulty in this respect.

Question: Where a guardrail is used, would you feel just as safe without it (i.e., if you accidentally left the roadway would you just as soon continue down the slope as to be stopped by the guardrail)? (Answers: A--Most of the Time; B--Sometimes; C--Seldom; D--Never)

A	B	C	D	Comments
	X			No guardrail should be put in a cut.
		X		The guardrail used here indicates a slope that only luck would allow you to leave the road safely.
				Guardrails are needed on these side slopes.
			X	There was no guardrail, but I would have felt safer with a guardrail at the creek having the deep and sharp side slope.
	X			
	X			Little, if any, guardrail was observed in this section. There were some very hazardous locations which needed some kind of protection.

Question: Does there appear to be an excessive amount of official informational signing along this section of roadway? (Answers: Yes; Possible--Pos.; No)

Yes	Pos.	No	Comments
		X	
		X	I noted a lack with regard to the sides of the roads and the business areas.
		X	With the exception of the "SHOOTING ABSOLUTELY PROHIBITED" sign.
		X	Too little, if anything, with the exception of one "CROSSWALK" sign.
		X	
		X	
	X		Probably too much advertising rather than official signing.

SUMMARY OF THE DIAGNOSTIC QUESTIONNAIRES

Study Site No. 10; State Highway 1; Anchorage, Alaska

The following is a detailed presentation of the comments made by the diagnostic team members on the diagnostic questionnaires, concerning the nightime conditions.

NIGHT PHASE

Question: Are the intersecting roadways obvious to the reasonably alert driver so that a smooth, natural turn onto them is possible? (Answers: A--Yes; B--In Some Cases; C--No)

A	B	C	Comments
	X		Some are not marked.
	X		There were very poor or no street sign postings.
	X		The intersection symbol signs give warning of some intersections, but the road name signs are not visible until the driver is turning into the road.
	X		There is good advance warning on S.H. 1, but there is generally poor markings on the side roads.
	X		Even with a warning sign and a reduced speed, I almost completely missed one turn. The turn was sharp (greater than 90 degrees).
		X	Signs are too small to read in the twilight. It would be impossible in the dark.
	X		Some are located on curves.

Question: Is the through lane easily distinguishable from the shoulder?

Yes	No	Comments
X		The shoulder stripe is broken in some places.
X		Due to the white guide line. One paved side road had no lines, which caused some confusion.
X		The edge line is very effective.

Yes	No	Comments
X		In some places though, the center stripe appears to be gone. The shoulder stripe should be repainted.
X		
X		
X		Good shoulder striping.

If "Yes," how is it accomplished; if "No," how could it best be accomplished?

Shoulder Stripe

Any paved surface should be lined.

Use a white stripe or an orange stripe for the winter.

White line.

Edge striping.

Shoulder striping.

Question: Are the roadside hazards visible for a sufficient distance to prevent the driver's being startled by them?

Yes	No	Comments
	X	Mailboxes
	X	Many mailboxes had no reflectors and could cause a problem for someone pulling off the road in a hurry.
X		Or they are not visible at all (steep side slopes).
X		In general, they are not marked, or they are not apparent which is good in one sense.
		There was no indication for speed reduction on curves. I seemed less aware of the narrow shoulders than during the day.
	X	
	X	Some obscured by brush, etc.

If "Yes," how is this accomplished; if "No," how can it best be accomplished?

Reflectors

If the mailboxes must be left at the roadside, they should be reflectorized.

A single button delineator might be used on the mailboxes, since they are so close to the roadway. Although mailboxes do not constitute much of a hazard, they are bothersome.

Reflectorized posts. If this is done on the mailboxes, they should be a standard distance from the white stripe to conform with the line of the roadway.

Delineators.

Provide clear sight distance; remove distractions.

Question: Is a clear and distinct outline of the roadway ahead provided?

Yes	No	Comments
	X	Topping a rise.
X		
	X	The dark background makes it difficult to pick up the outline of the roadway through some of the horizontal curves.
	X	There is some interference from roadside signs and from a dark background (hills and brush) behind the dark asphalt roadway.
	X	There was uncertainty when approaching hills and curves. Also, intersections were difficult to see at a distance.
	X	
	X	It was generally good, but some curves provided difficulty.

If "Yes," how is this accomplished; if "No," how can this best be accomplished?

Roadside markers.

By use of the white edge line.

		Delineators would be helpful on some of the curves, both horizontal and vertical.
		Striping helps, but reflectors on posts would be better. Use orange reflectors for winter conditions.
		Incorporate standard reflectors, preferably white. Use evenly spaced reflectors to outline the intersections and on the outside of curves.
		Delineators.
		Use delineators on curves.

Question: Is the light provided by the vehicle's headlights sufficient for safe operation of this facility?

Yes	No	Comments
X		
X		Only if you drive within your headlight range.
X		
X		This could be a problem on darker nights because of steep fills and some unmarked curves.
X		
X		
X		

Question: Is there sufficient advance notification of intersecting roadways?

Yes	No	Comments
X		On the main intersecting roadways.
X		This was done with warning signs.
	X	Not by name and not at all in some cases.
X		Good notice on S. H. 1; very poor on some side roads intersecting S. H. 1.
X		For main side roads.
X		But road names are not given in advance.
	X	Some are marked; others are not.

Question: Can the existing directional signs be easily read at a glance?

Yes		No	Comments
X			
X	&	X	Most of the secondary road signs were very hard to read; however, a few were well posted.
			Not applicable.
X			The lettering could still be larger though.
X			Much more so than during daylight.
X			
		X	Some are obscured by other informational signs.

Question: Are the directional sign messages clear and concise so as to eliminate the possibility of driver confusion?

Yes	No	Comments
X		
X		There could be more of them.
		Not applicable.
X		Some roadside signs are extraneous, as are signs the public puts up of all shapes and colors.
X		
X		
	X	They are clear, but often insufficient information is given.

Question: In my opinion, the sight distance to right-of-way control devices ("STOP" signs, "YIELD" signs, signals, etc.) at night is:

/___/ ADEQUATE /___/ INADEQUATE

/___/ QUESTIONABLE /___/ CRITICAL

A	Q	I	C	Comments
X				

A	Q	I	C	Comments
X				The streets posted were well-posted and easily visible at night.
X				In at least one case, no need was seen for the "STOP AHEAD" sign (Klatt Road). In other instances this sign was helpful.
	X			The lettering could still be bigger, especially for snow conditions and for drivers with questionable eyesight. The lettering should be reflectorized along with the background in all cases, as I believe the "STOP" signs are.
X				Much more apparent at night; easier to see at a distance.
	X			
	X			No specific observation.

Question: Where hazard warnings are provided, can they be easily associated with the hazard involved?

Yes	No	Comments
X		
X		Some areas that are hazards were not posted.
X		With the exception of the "NEXT X MILES" portion of the "MOOSE CROSSING" sign and possibly the "CROSSWALK" sign.
	X	The "CROSSWALK" sign after the crosswalk is questionable. There are insufficient hazard signs.
	X	The "FIRE STATION AHEAD" sign could not be read easily. The station was off on a side road.
X		Generally.

Question: Do commercial signs and lights along the roadside attract your attention?

Yes	No	Comments
X		Bright and flashing commercial signs.

Yes	No	Comments
X		Too bright and flashing.
X		To a small extent.
X		These are worse when a car is approaching in the opposite lane.
	X	However, I still feel that these signs and other objects in this area are too close to the road for both day and night driving.
	X	They were not distracting at the level of light during the run.
X		There is a definite problem in this area.

If "Yes, " which signs or lights were of concern to you?

Commercial lights.

Those business signs concerning liquor.

The flashing signs are especially bothersome when near the roadway.

The blinking lights which, as one came up a hill, appeared at that distance to be on the roadway.

The reflectorized information signs which are close to the pavement, as well as the very bright signs for motels, bars, etc.

APPENDIX "C"

SUMMARY OF DRIVER INTERVIEWS

STUDY SITE NO. 10; STATE HIGHWAY 1; ANCHORAGE, ALASKA

GEOMETRIC DESIGN

DAY PHASE

The mailboxes block the vision to the left (the driver is on the westbound approach to Seward Highway on Klatt Road).

The shoulders are bad in this area (the driver is approaching Huffman Road going southbound).

The mailboxes are too close to the road (the driver is approaching Dare Ave. going southbound).

The shoulders are too narrow (the driver is just beyond Dare Ave. on the Seward Highway going southbound).

This pavement is awfully narrow (the driver is at the Potter turnaround going southbound).

You need a guardrail in this area (the driver is going southbound and approaching the development just north of Rabbit Creek Road).

There is not much sight distance at this turn (the driver is attempting to make the right turn onto O'Malley from the Seward Highway going northbound).

They need a guardrail in front of that drop-off (the driver is referring to the steep drop directly east of the intersection of O'Malley and the Seward Highway).

NIGHT PHASE

The shoulders are good here (the driver is referring to the shoulders on O'Malley Rd.).

The lack of sight distance is bothersome at several points.

The mailboxes restrict the sight distance at this point (the driver is referring to the sight distance to the north approaching State Highway 1 from Klatt Rd. going westbound).

They certainly need some treatment at the commercial entrances (this is a general comment made by the driver at the turnaround point).

The sight distance on the vertical curves is too short (this comment is made approximately ½ mile south of the intersection with Rabbit Creek Rd.).

They need a wider shoulder and guardrail at the steep fill (this comment is made in the northbound approach to the Rabbit Creek Rd. intersection on the Seward Highway).

The discontinuity of the road surface is bothersome.

I had a tendency to turn too soon (the driver is referring to the right turn onto O'Malley Rd. from the Seward Highway going northbound).

The narrow lanes are more difficult to travel at night.

DAY PHASE

The shoulders are too narrow (the driver is referring to the shoulder on the section just South of O'Malley Road on State Highway 1).

They need a guardrail in this area (the driver is referring to the steep drop-off just south of the intersection with Rabbit Creek Rd. on the Seward Highway).

These verticals are a little steep (the driver is referring to the vertical curves in the study section and lack of sight distance over the top of the curve).

There seems to be a drop from the roadway edge to the gravel shoulder (this comment was made on the approach to Huffman Rd. going northbound).

There is no control of the commercial entrances in this area.

The shoulders are too narrow (the driver is referring to the shoulders in the area between the intersection of O'Malley Rd. and Klatt Rd.).

These mailboxes are bothersome (the driver is referring to the proximity of the mailboxes to the through traveled-way).

The shoulders are too narrow to be safe.

The sight distance is bad along here (the driver is referring to the vertical curvature just south of Rabbit Creek Rd. on the Seward Highway).

The highway could be a little wider.

NIGHT PHASE

They need a guardrail on that curve (the driver is referring to the horizontal curve approximately ½ mile south of the Potter turnaround outside the study section.

That short section of guardrail should be extended around the curve (comment refers to horizontal curve approximately ½ mile south of Potter turnaround outside the study section).

The rough road surface does bother me some.

The wider road is easier to drive (the driver is referring to the wider roadway on O'Malley Rd. as compared to the Seward Highway).

The mailboxes block the street name signs (driver is approaching Klatt Rd. on the Seward Highway going southbound).

The shoulders are not well defined.

Intersections are hard to find.

The shoulders are more easily defined at night than the daytime (this is the same driver that commented just previously that the shoulders are not well defined).

The shoulders are too narrow (the driver is referring to the road section approximately 1 mile south of the intersection with Rabbit Creek Rd. on Seward Highway).

The road surface is uneven, and there is no centerline (the driver is referring to the area approximately one-half to one mile north of the Potter turnaround point).

There seems to be a pavement lift on the right side of the road.

I can't find the intersection (the driver is referring to the Klatt Rd. intersection).

DAY PHASE

The steep drop could be hazardous.

They need a wider shoulder through this area (the driver is referring to the side slopes going northbound just in advance of the Rabbit Creek Rd. intersection).

There is a need for wider shoulders (comment refers to shoulder approaching D'Armoun Rd. going northbound).

There is a need for wider shoulders (this comment is made on the approach to O'Malley Rd. going northbound).

The speed limit may be too fast (this comment is made just after making the left turn onto the Seward Highway from O'Malley Rd.).

The pavement surface is very rough (this comment is made approximately ½ mile south of Rabbit Creek Rd. intersection).

The shoulders are not very well defined (this comment is made on D'Armoun Rd. going east).

The pavement is generally in poor shape.

The highway is narrow, and the intersecting side roads are in poor shape. They need to flare the intersections to the side roads.

The mailboxes and roadside signs are too close to the road (this comment is made between Dare Ave. and D'Armoun Rd. going southbound).

NIGHT PHASE

The side roads are hard to find. The shoulders don't seem particularly narrow to me.

The side roads could use a pavement apron.

DAY PHASE

NIGHT PHASE

The side slopes are too steep (the driver is referring to the road section of approximately ½ mile south of the intersection of Rabbit Creek Rd. and the Seward Highway).

The shoulders are too narrow (this comment is made on the approach to the Potter turnaround going southbound).

The pavement is ragged at the edge of the shoulder (this comment is made just after reentering the study section at Potter going northbound).

The mailboxes are distracting (this comment is made just north of Klatt Rd. going northbound).

The business access needs some control (the driver is referring to the commercial area just north of Klatt Rd. on the Seward Highway).

The shoulders are too narrow (this comment is made between Klatt Rd. and Huffman Rd. going southbound).

The side slopes are too steep (this comment is made between Dare Ave. and D'Armoun Rd. going southbound).

The intersections are poorly defined (this comment is made on the southbound approach to D'Armoun Rd.).

The lack of shoulders is dangerous. The lane is very narrow.

The trees on the inside of the curves are too close (this comment is made approximately ¼ mile north of the Potter turnaround).

In some places along the road there is a distinct drop from the pavement to the shoulder.

DAY PHASE

NIGHT PHASE

These commercial drives should have some control (this comment is made just north of Dare Ave. going northbound).

The shoulders are too narrow (this comment is made just after making the left turn onto the Seward Highway from the old highway road going southbound).

The steep side slopes are troublesome (the driver is referring to the side slope in the area between Rabbit Creek Rd. and the Potter turn-around).

Some of the vertical curves are not really satisfactory. The passing zones are too short.

The mailboxes are certainly close to the roadway (this comment is made just after turning onto State Highway 1 from O'Malley Rd. going southbound).

The shoulders are too narrow (this comment is made on the approach to D'Armoun Rd. going southbound).

This steep hill has a bad sight distance (the driver is referring to the vertical curvature approximately ½ mile south of the Rabbit Creek Rd. interchange with the Seward Highway).

You need a guardrail on this fill (the driver is referring to the fill approximately ¼ mile south of the intersection with Rabbit Creek Rd.).

SIGNING

DAY PHASE

The D'Armoun sigh is inconspicuous. The sign at the top of the hill is not too good ("MOOSE CROSSING"). The sign at the top of the hill is too close to the roadway (the driver is referring to the "INTERSECTION AHEAD" warning sign for D'Armoun Rd.).

There are no confirmation markers in this section. The advance intersection signs are well placed (the driver is referring to the intersection warning signs).

There is no street name sign at Dare Ave. There is no advisory speed on the curves.

That "PHONE 1300 FEET" sign is not necessary.

There is not sufficient information for the intersections.

There are no street name signs on Dare Ave.

There is no identification of State Highway 1 at this point (the driver is referring to the approach to the Seward Highway on Hamilton St.).

The crosswalk sign is too close to the crosswalk (the driver is referring to the warning sign for the crosswalk at Dare Ave.).

I think a name plate would be good on the intersection sign (the driver is referring to a supplementary name plate on the intersection warning sign).

NIGHT PHASE

The route sign should be at the "STOP" sign (this comment is made in the approach to Seward Highway on O'Malley where the route information is in advance of the required stop).

The intersection sign shows up well (this comment is made just in passing Klatt Rd. going southbound).

There are no street name signs on Dare Ave.

There should be some type of control at this intersection (the driver is referring to the intersection of Hamilton and the Seward Highway).

The sign "FIRE STATION AHEAD" was readable, but I'm not sure what it means.

The control sign shows up very well on that curve (the driver is referring to the reference markers used for referring to the study).

The "FIRE STATION AHEAD" is not a meaningful sign to me.

The street signs are hard to read.

The sign at the end of the curve is distracting (this comment is made just south of the Klatt Rd. intersection coming northbound).

The "STOP AHEAD" sign is very effective (the driver is on Klatt Rd. approaching the Seward Highway).

The Klatt Rd. sign is hard to read.

The "STOP AHEAD" sign is unnecessary (the driver is referring to the "STOP AHEAD" warning sign on the approach to Seward Highway from Klatt Rd.).

DAY PHASE

They need some curve warnings on that curve (the driver is referring to the horizontal curvature approximately 1 mile south of the Rabbit Creek Rd. intersection).

The street name signs are very hard to read.

The "STOP" sign is too far removed (the driver is referring to the placement of the "STOP" sign on O'Malley Rd. at Seward Highway).

The street name sign is not good (the driver is referring to the street name sign at Klatt Rd. going southbound).

There is no control on the minor road approaches to State Highway 1 (the driver is referring to the minor approach approximately ¼ mile south of D'Armoun Rd.).

A name plate on the intersection sign would be good (the driver is referring to a supplementary plate on the intersection warning sign).

The double arrow is confusing and doesn't indicate any direction (the driver is referring to the double-headed arrow opposite the intersection on O'Malley Rd. and the Seward Highway).

A name plate on the intersection sign would be helpful (the driver is referring to a supplementary plate on the intersection warning sign).

Klatt Rd. is difficult to find. They need some advance street signing.

Klatt Rd. is impossible to find.

NIGHT PHASE

The Huffman Rd. sign is hard to read.

The "CROSSWALK AHEAD" sign is distracting.

The street name sign is hard to find (the driver is referring to the street name sign at D'Armoun Rd.).

They need a "STOP" sign at the entrance to a main highway (the driver is referring to the minor approach approximately ¼ mile south of D'Armoun Rd.).

The "FIRE STATION AHEAD" warning sign is not needed.

Route signs and speed limit signs should be separated.

The road name signs are hard to pick up.

The double-headed arrow in the head-on position at T-intersection is good.

The mileage signs are well sized for the speed limit (the driver is referring to the post-mile system employed in Alaska).

They need a road name sign in addition to the warning sign (the driver is referring to an advance street name sign in addition to the intersection warning sign).

They need a "STOP" sign at this intersection (the driver is referring to the intersection of Hamilton and the Seward Highway).

The "FIRE STATION AHEAD" sign appears to be badly weathered.

This intersection is cluttered with signs (the driver is referring to the intersection of O'Malley and the Seward Highway).

DAY PHASE

The intersections are poorly defined.

The signing is not adequate (the driver is referring to the signing on O'Malley Rd. approaching Seward Highway).

Klatt Rd. sign is off the road. A name plate on the advance intersection sign would be effective.

There is no advisory speed on the curve signs (the driver is referring to the curve approximately 1 mile south of Rabbit Creek Rd. intersection).

There are no cardinal directions on the route markers.

The Klatt Rd. street name sign is only visible from the south (the driver apparently meant while going south).

The state highway route marker should be mounted separately from the speed limit sign.

There are not many confirmatory markers.

Huffman St. is not signed adequately.

The "PHONE 1300 FEET" sign? How far is 1300 ft.? Is it on the left or on the right?

Dare Ave. is not marked.

There is no control on the approach to the Seward Highway (the driver is referring to Hamilton Ave. approach to the Seward Highway).

NIGHT PHASE

The Klatt Rd. sign is hidden. (The driver is referring to the blockage of the street name sign by the mailboxes.)

I don't see the "STOP AHEAD" sign very well (the driver is referring to the "STOP AHEAD" warning sign on Klatt Rd. in advance of the Seward Highway intersection).

The double-headed arrow sign is confusing (the driver is referring to the double-headed arrow used in the head-on position for the T-intersection).

The "FIRE STATION AHEAD" sign is not needed.

I couldn't read the D'Armoun Rd. sign (the driver passed D'Armoun Rd.).

I do believe, however, that the street name signs show up better at night.

I think they need a name plate on the "INTERSECTION AHEAD" signs.

The signs are easier to read at night.

The reflection on the signs is sufficient (the driver is referring to the reflectorization of the signs).

Those street name signs are on the left instead of on the right.

Dare Ave. is not signed.

The intersection is not signed at all with "STOP," "YIELD," or anything (the driver is referring to the intersection of Hamilton with the Seward Highway).

There are no advisory speeds on these curves (the driver is referring to the curves approximately ½ mile north of the Potter turnaround).

DAY PHASE

There is no sign on Klatt Rd. from this direction.

I think the post-mile system is good. It gives you a reference distance.

NIGHT PHASE

I can't find the intersection (the driver was looking for Klatt Rd. going northbound).

The street name sign is too far removed to the right (the driver is referring to the street name sign for O'Malley Rd. travelling northbound).

The side streets are hard to find, although driving at night is easier.

The "STOP" sign is too far from the intersection (the driver is referring to the O'Malley intersection with the Seward Highway).

Klatt Rd. is hard to find.

The Huffman Rd. sign is hard to see.

We need some control at the intersection (the driver is referring to the Hamilton Rd. intersection with the Seward Highway).

The approach signs need the name of the intersections (the driver is referring to a supplementary name plate on the intersection warning signs).

The warning signs block the "STOP" sign (the driver is on the approach to the Seward Highway on O'Malley Rd.).

The "INTERSECTION AHEAD" signs need name plates.

That sign is badly placed (the driver is referring to a sign placed just in a horizontal curve).

DELINEATION

DAY PHASE

NIGHT PHASE

The mailboxes should be reflectorized.

There should be some reflectors at the edge of the ditch.

There should be reflectors on the mailboxes. The mailboxes need delineators.

There is some need for delineation on the horizontal curves.

Delineation on the outside of the curve would be very beneficial (this comment is made in the section just south of the Rabbit Creek Rd. intersection where the heavy growth on both sides of the road makes it very dark at night).

In this section with heavy forest cover delineation is needed on the horizontal curves.

The mailboxes need reflectors.

Post-mounted delineators on the curve up a hill would be helpful.

They need delineation on the mailboxes.

They need delineators on the outside of the curve (this comment is made just inside the study section approaching the Potter turnaround).

Delineators would be good on the curves.

They need some delineation on the curves.

They need reflectors on the mailboxes.

The limits of the shoulders are not well defined.

DAY PHASE

NIGHT PHASE

The intersections are hard to find. Some delineators might help.

Side streets are hard to locate.

Need reflectors on the mailboxes.

Curves should have some delineators.

ILLUMINATION AND GLARE

DAY PHASE

NIGHT PHASE

Get some glare from the luminares at the side of the road (the driver is referring to glare from the lighting of the commercial area just in advance of the Dare Ave. intersection).

Some flashing lights are distracting (the driver is referring to the flashing light at the funeral home at the intersection of Klatt Rd. and Seward Highway).

I do get some glare from the roadside advertising (this comment refers to the commercial area between Hamilton Ave. and Dare Ave.).

Approaching cars at night with their headlights on make the road appear even narrower.

Flashing lights are distracting (this comment is made approaching Klatt Rd. going southbound).

Flashing signs tend to be distracting.

The flashing lights and the lights on the side of the road are distracting at certain points along the roadway (general comment made by the drivers at the completion of the driving run).

Flashing commercial lights are distracting (this comment is made approaching Klatt Rd. going southbound on the Seward Highway).

The bright lights from businesses are distracting (this comment is made approaching Klatt Rd. going southbound on the Seward Highway).

The commercial signs are too bright (the driver is referring to the commercial signing associated with the development between Hamilton and Dare Ave. on the Seward Highway).

PAVEMENT MARKINGS

DAY PHASE

They need some advance markings on side streets.

Edge striping is very good.

The centerline is missing (the driver is referring to the area between Rabbit Creek Rd. and Potter turnaround).

There is not adequate marking on this intersection (the driver is referring to the Huffman Rd. intersection with the Seward Highway).

This is a well marked intersection (the driver is referring to the Dare Ave. intersection with the Seward Highway).

The white in the center is unnecessary (the driver is referring to the combination line created by a double no-passing zone and a white centerline).

The centerline is worn-out (the driver is referring to the area where horizontal curves are approximately 1 mile south of Rabbit Creek Rd. intersection).

There is no centerline here (the driver is referring to the area approximately ¼ to ½ mile north of the Potter turnaround area).

The no-passing warnings are not too good (apparently the driver is referring tothe length of the no-passing zones as related to the vertical alignment of the roadway).

The edge line seems inconsistent in spots.

NIGHT PHASE

The edge line shows up real good (the driver is referring to the edge line on O'Malley Rd.).

I can't see the center stripe (the driver is referring to the area just north of the Potter turnaround).

The edge line is very useful.

A stop bar could be used at this intersection (the driver is referring to the intersection of O'Malley Rd. and the Seward Highway).

The edge line is good in this area (this comment is made very near the fire station).

The centerline is missing (this comment is made just in advance of the Potter turnaround).

There should be a break in the edge line for public roads but not for commercial driveways.

The edge line is gone (the driver is referring to the area approximately ½ mile north of the Potter turnaround).

I think a yellow centerline would show up better, particularly in the winter time.

There is no centerline; that's bad (the driver is referring to the area approximately ½ mile north of the Potter turnaround).

The edge line shows up very well (the driver is referring to the edge line on O'Malley Rd.).

DAY PHASE

The no-passing lines need painting (this comment refers to the area between Klatt Rd. and Huffman Rd. on the Seward Highway).

There is no centerline, also the pavement surface is rough (this comment refers to the area between Rabbit Creek Rd. and the turnaround point at Potter).

The shoulders are not well defined.

The irregular edge striping is confusing (the driver is referring to the overlapping of several stripes and doubling of stripes in some areas).

The centerline is faded-out (this comment refers to the area approximately ½ mile north of the Potter turnaround).

Edge lines are very helpful.

The striping is better than it was a little way back (the driver is referring to the area just south of D'Armoun Rd.).

Some of the vertical curves are not really satisfactory, and the no-passing zones are short (the driver is referring to the area between Rabbit Creek Rd. and the Potter turnaround).

The markings on the road could be improved (general comment made by the driver at the end of the driving run).

NIGHT PHASE

The centerline is gone (the driver is referring to the centerline on O'Malley Rd. approaching the Seward Highway).

The edge line is good (this comment is made just after entering the Seward Highway from Klatt Rd. going southbound).

The edge line is very helpful in guiding. There is no centerline (the driver is referring to the area approximately 1 mile south of the Rabbit Creek Rd. intersection with the Seward Highway).

The road surface is uneven, and there is no centerline (this comment is made just in advance of the Potter turnaround).

The barrier stripes are too short (the driver is referring to no-passing zones just south of Dare Ave. on the Seward Highway).

The centerline needs replacing (this comment is made approximately ½ mile south of the Rabbit Creek Rd. intersection).

There are no road markings at all (the driver is referring to the lack of markings on Huffman Rd.).

They need a stop line at the intersection (the driver is referring to the intersection of Huffman Rd. and the Seward Highway).

The striping is washed out (the driver is referring to the markings on O'Malley Rd. in advance of the Seward Highway).

Edge striping is very helpful.

The centerline is worn-out (this comment is made just after entering the study section going northbound at the Potter turnaround).

MISCELLANEOUS COMMENTS

Approaching cars at night with headlights make the road appear more narrow than in the daytime.

The post-mile marker stands out very well.

The shoulders seem larger at night.

Driving at night is easier.

The overhead utilities are annoying to me.