SCHOOL TRIP SAFETY AND URBAN PLAY AREAS

volume V

guidelines for the development of safe walking trip maps

U.S. DEPARTMENT OF TRANSPORTATION
Federal Highway Administration

FHWA-RD-75-108

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16. Abstract

The purpose of the School Trip Safety and Urban Play Areas research project was to develop guidelines for the protection of young pedestrians (5 to 14 yrs.) walking to and from school. The other six volumes produced under this project are:

Volume I - Executive Summary
Volume II - Student and Driver Perception of School Trip Safety and Traffic Control Devices
Volume III - A Survey of the Characteristics of the Urban Play Street
Volume IV - An Analysis of Daylight Savings Time-Related Student Pedestrian Safety Problems and Countermeasures
Volume VI - Guidelines for Planning School Bus Routing and Scheduling
Volume VII - Guidelines for the Creation and Operation of Urban Play Streets

This document presents a set of procedures for developing and implementing safest school route maps.

School officials, parents, traffic engineers, police and the children themselves share the responsibiligy for a safe trip to and from school. The local traffic engineer is usually called upon to develop and maintain safest school route maps, where they are used. Consequently, this guidebook is primarily designed for traffic engineers to use in meeting their responsibility.

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PREFACE

The safety of the young pedestrian walking to and from school is not the concern of the traffic engineer, the school system safety representative, the principal, the police safety expert, the crossing guard, the parent, the passing motorists, or the students. . .alone! *It is the job and should be the concern of each and everyone of them and us*!

The Safest Routes Map Program can serve to provide a traffic engineering approach to school child safety that encompasses the student, the parent, the principal and the teacher.

We hope that this document will help you in making the students' walking trip to and from the school safer.

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Background

Young pedestrians, under fifteen years of age, have experienced problems which have resulted in an accident involvement twice that for any other age group. The magnitude, severity, and loss to society of this population highlights the need to significantly reduce the number of these pedestrian accidents.

Existing pedestrian accident data is urban in its orientation. Knoblauch (1975) provides data from six cities indicating that pedestrians under fifteen years of age represented 45 percent of a 2,044 accident data base. A BioTechnology analysis of 4,930 pedestrian accidents that occurred in Washington, D.C. between 1971 and 1973 indicates the population under fifteen represented 53 percent of the data base. The five to nine year old population comprised 30 percent of the accident population. Thus, there is a significant accident reduction potential for any safety program aimed at the school age pedestrian population.

Considering this most involved pedestrian accident age category, five to 14 years, it becomes apparent that this group's exposure can best be controlled during the time they are walking to or from school. The American Automobile Association estimates that each year, 500 children are killed and 11,000 are injured en route to or from school (AAA, 1968). The school or school bus stop was the origin for 16 percent and the destination for 14 percent of the young (five to 14 year old) pedestrian accidents.*

Analysis of the ages of young pedestrians in 1,910 school trip pedestrian accidents reported by the AAA reveals that there is a near monotonic relationship between age and accident involvement for the five to 14 year old population. The youngest students are considerably over represented in the school trip accident data. The oldest students are conversely under represented in the school trip accidents (see Figure 1).

An attempt was made to determine the relationship of students' knowledge and stated behaviors utilized in their walking trip to school to the dramatic differences by age of their accident involvement. This was done by surveying about 1,000 students in their classrooms. Their response to questions were analyzed to determine whether or not the kindergarten and third grade responses were significantly different from those of the sixth and eighth graders. The students' age can generally be described by adding five to the school grade (kindergarten = 5 years, third grade = 8 years, sixth grade = 11 years, eighth grade = 13 years). A "Z" test of uncorrelated proportions was used to test differences. All differences reported were significant beyond the .05 level (two tail).

*BioTechnology, 1975, Knoblauch (unpublished) California, Missouri, Michigan, North Carolina, Pennsylvania, Texas, 1,500 accidents.

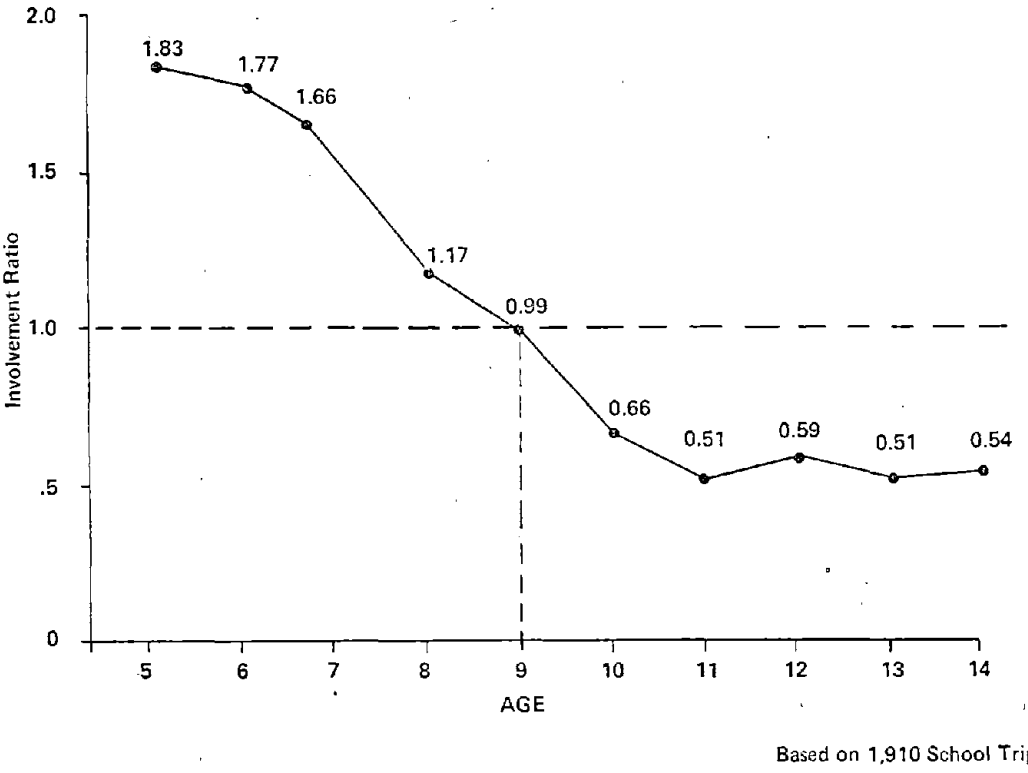


Figure 1. Young Pedestrian Accident Involvement

Significantly more of the younger students than the older students indicated:

- that they are either unaware of or do not discriminate between various traffic control devices.
- that the only safety technique they relate to is the presence of a uniformed adult crossing guard, policeman, or school safety patrol guard.
- that they would change their route primarily if told by parents, and a smaller percentage if told by the school.

They did this in a number of ways. When asked to rank a number of pictures on the basis of helping them safely cross the street, the youngest students picked the crossing guard as a first choice significantly more often than the older students. As to the other pictures, a traffic light, a crosswalk, and an unprotected corner, they did not discriminate between these choices as the older students did.

When given three choices for crossing the street to the school and shown a picture of a street with an unprotected corner, an unmarked midblock crossing, and a crosswalk on a corner,

significantly more of the youngest students than the older students picked the unprotected crossings over the crosswalk. Significantly more of the five and eight year olds indicated that they would cross the street on a red light than did the 11 to 13 year olds.

What these responses indicate is that the mere presence of traffic control devices (normally considered by traffic engineers, school officials, and parents to enhance school trip safety) at school crossings is not adequate for the youngest student populations. This conclusion is reinforced by the accident statistics.

Purpose and Scope

What is required to combat the problem just described is a complete program that begins with an evaluation of the road network in the area of the school and creates a means by which information concerning the safest routes to and from school can be transmitted to each parent and child. Safest school route maps are an integral part of such a program. This guidebook presents a set of procedures for developing and implementing safest school route maps. The procedures are based on a review and synthesis of information gathered from several existing safest route to school programs in the following locations: Dade County, Florida; Long Beach, California; Oceanside, California; San Diego, California; Sioux City, Iowa; and Toledo, Ohio. Other sources of information used to support the procedures included:

- Section 7A, Manual on Uniform Traffic Control Devices – Federal Highway Administration
- A Program for School Crossing Protection – Institute of Traffic Engineers
- Procedural Manual for Preparing a School Route Plan – Missouri State Highway Commission
- School Traffic Engineering Program for Safety – Final Report, Highway Safety Project, City of Los Angeles
- Safest Route to School (Guide for Parents) – Automobile Association of America
- A Teachers Guide for the Safest Route to School Project – Automobile Association of America
- The Safest Way – 16 mm color film, Automobile Association of America

Responsibilities

School officials, parents, traffic engineers, police, and the children themselves share the responsibility for a safe trip to and from school. Normally, the school has the primary

responsibility for developing and maintaining a safety program that encompasses the trip to and from school.

In the locations surveyed that have ongoing safe school route programs, the responsibility for developing and maintaining safest school route maps is that of the local traffic engineering office or department. This appears to be both reasonable and practical in view of the engineering analyses, judgement, and jurisdiction required in making the maps.

The point that cannot be emphasized too greatly is that a safe school route program is a coordinated effort, and each element of the program must receive inputs from all concerned, i.e., school officials, parents, police, and traffic engineers, regardless of who is primarily responsible for that element. Coordination will be stressed throughout the guidebook with indications given as to how, when, and with whom it may best be effected.

Relationship of the School Trip Map to Other Programs

In addition to being an integral part of the school trip safety program, the development of safest school route maps serve several other functions and uses which include:

- Providing a basis for engineering studies of traffic control needs.
- Indicating priorities for sidewalk construction.
- Providing for the most effective use of protective measures such as traffic control devices, adult crossing guards, and school patrols.
- Assisting in the establishment and/or adjustment of school attendance areas.

The school route maps often provide the impetus for school trip safety programs of a much broader scope involving the whole community. Delivering the Safety Message often involves local safety councils, automobile associations and representatives of mass media in addition to the teachers and PTA's. It is hoped that educational specialists will use the map in geography, drawing, mapping, and where ever possible in the educational curriculum.

GENERAL PROCEDURES

The main objective of the safest route to school map is to guide children walking to *and* from school so that roadside and roadway crossing hazards are avoided or at least minimized. The step-by-step procedures presented below suggest ways of developing, implementing and maintaining safe route to school maps (see Figure 2). Some of the steps present a series of alternative ways of accomplishing the step, thus allowing flexibility in matching the requirements of the step to the local situation.

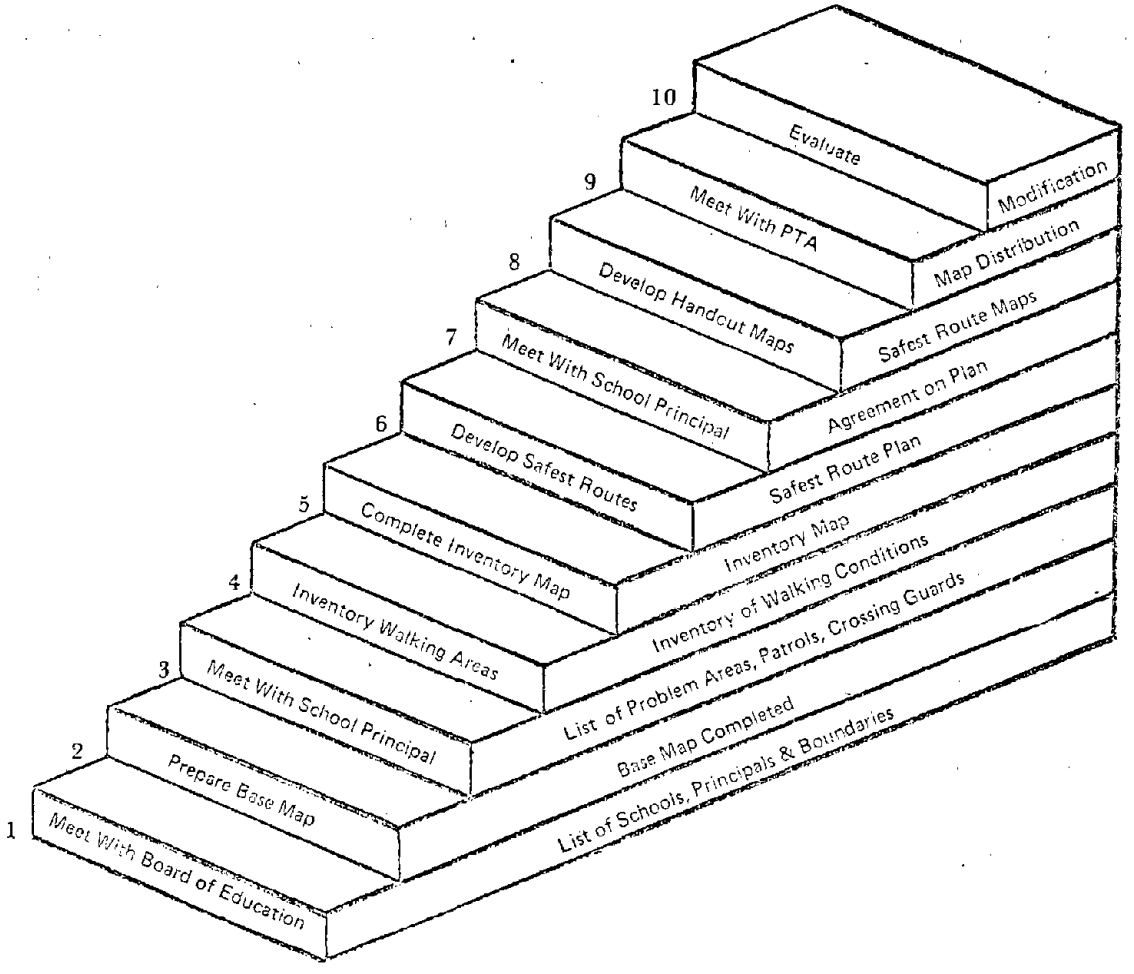


Figure 2. Safest Route Map Procedures and Products


SAFE
ROUTE
MAP

Step 1. Meet with the Board of Education

A safest route to school program may be initiated by either the board of education or the traffic engineering department. The purpose of the meeting with the board of education is to provide a mutual understanding and agreement as to who will be responsible for each step in the program. The superintendent of schools can aid the traffic engineer in gaining the cooperation of the school principal of each school. If the superintendent of schools is a strong supporter of the program, then the chance of the program being successfully implemented is excellent.

The school board should be able to provide the traffic engineer with a list of schools, school principals, and school boundaries. The superintendent of schools should write a letter of introduction for the Traffic Engineering Department asking school personnel to cooperate.

Step 2. Prepare a Base Map

Base maps are simply street maps of the attendance areas surrounding each school. The base map should be to scale. Scales in the range of 1" equals 200' to 1" equals 800' are usually adequate. The scale must be large enough to accomodate the inventory information that is discussed in Step 4.

Maps may be obtained from city, county, state planning or engineering agencies; chambers of commerce; or charitable organizations, such as the March of Dimes.

Most maps obtained from these sources will have more information than is required. It may, therefore, be necessary to make a tracing of the map that indicates only streets, paths, street names, street widths, and the school location. This tracing will become the original base map. Copies of the original map should be made for use in subsequent steps. An original base map is shown in Figure 3.

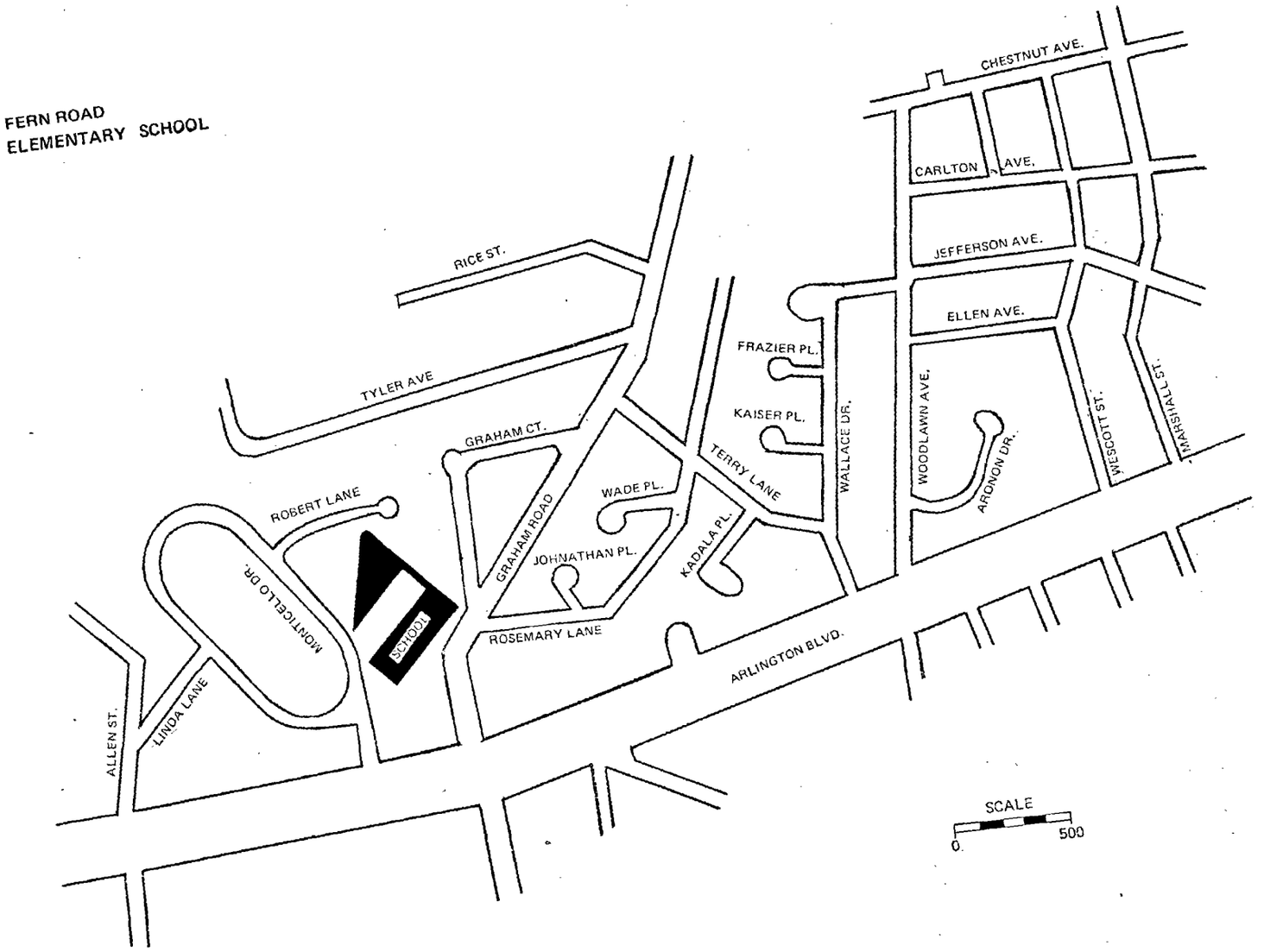


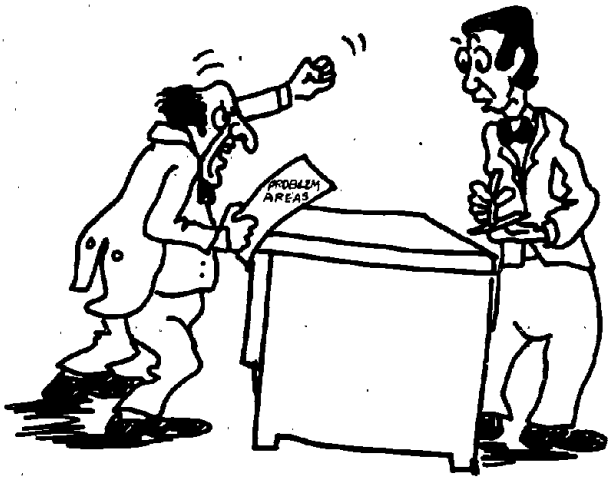
Figure 3. Base Map

Step 3. Meet with School Principal

A meeting with each school principal is essential. The school principal is usually assigned the responsibility for each student's safety from the time the child leaves his door step in the morning until he returns home in the evening. The school principal should be concerned with the students' walking trip and will usually be willing to cooperate in any effort to improve the safety of the students. It is important that he be familiar with the entire safest route program from the start.

The school principal should be able to provide contacts with the police school safety officer and the Parent Teachers Association.

He can also supply the following information: walking student areas, safety patrol locations, crossing guard locations, student enrollment, the ages and numbers of walking students, teachers responsible for the safety patrol program, school hours (both normal and extracurricular), problem areas, and verification of school boundaries. The school boundaries, location of school patrols and the areas from which students walk should be indicated on a copy of the base map, as well as, any problem areas or locations mentioned by the principal. Figure 4 shows a base map containing information provided by the school principal. Additional information will be added to this map in Steps 4 and 5.



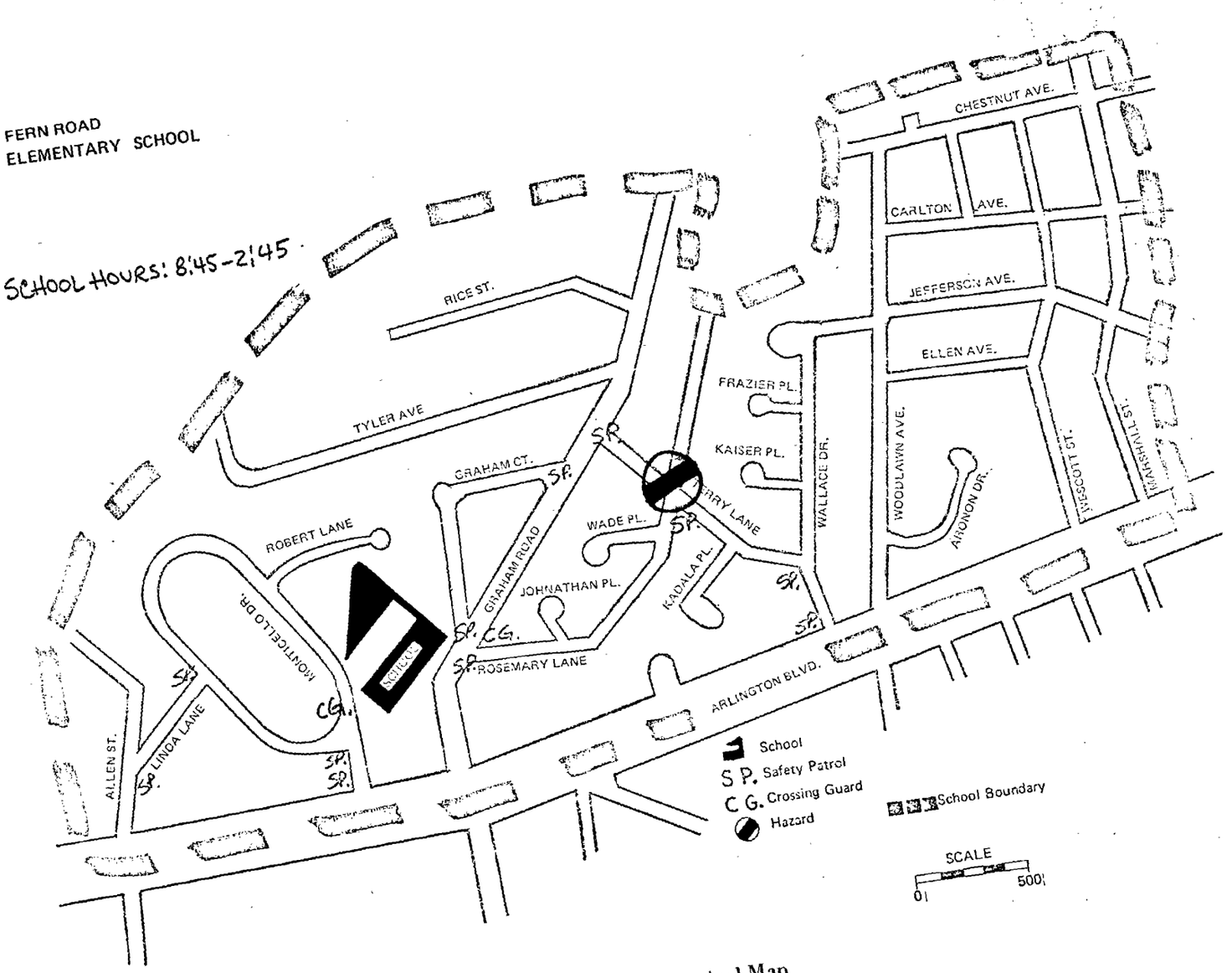
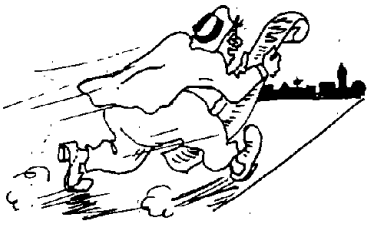


Figure 4. School Principal Map

Step 4. Inventory the Walking Areas

The purpose of the inventory to be performed in this step is to identify the existing walking conditions within the school boundary. The inventory is needed to assess existing protective measures that are available to aid students walking to and from school. The inventory should contain the following information:



- sidewalk and walking path locations
- traffic signals, signs and pavement markings
- locations that might pose a hazard to young pedestrians

The inventory should be performed by a traffic engineer. There are three alternative methods for performing the inventory. The first method consists of the traffic engineer and an assistant driving through the walking areas and making notes on the copy of the base map from step 3. Using codes or symbols, all signals (traffic and pedestrian), signs (stop, yield, school ahead, etc.), markings (crosswalks, words, symbols), sidewalks and paths should be noted on the map. Non-standard traffic control devices (see MUTCD) should also be noted. Special attention should be paid to the problem locations indicated by the principal. Additionally, locations that could pose a hazard to the young pedestrians, such as heavily traveled arterials, collector-distributors, streets with no sidewalks or shoulders, busy intersections without adequate crossing protection; streets with poor sight distances due to curvature or vegetation; etc. should be noted on the map. Figure 5 illustrates a field inventory map. This method is the most advantageous in that the traffic engineer can view the walking conditions first hand. For this reason, we recommend that the inventory be conducted during the times students are traveling to or from school.

The second method of performing the inventory is very similar to the first. It also consists of a drive-through of the area (sometimes referred to as a "windshield survey"). The same information is gathered as in method 1 except that a tape recorder is used in the field instead of making notations on a copy of the base map. The information recorded in the field is transferred to the inventory map back in the office. This method is usually more time consuming and can be more confusing than method 1.

Method 3 is the least desirable. This method relies solely on aerial photos and office records in constructing the field inventory map. Inaccuracy is the main disadvantage, and experience has shown that on-site visits reveal far more than can ever be recorded on aerial photos and office records.

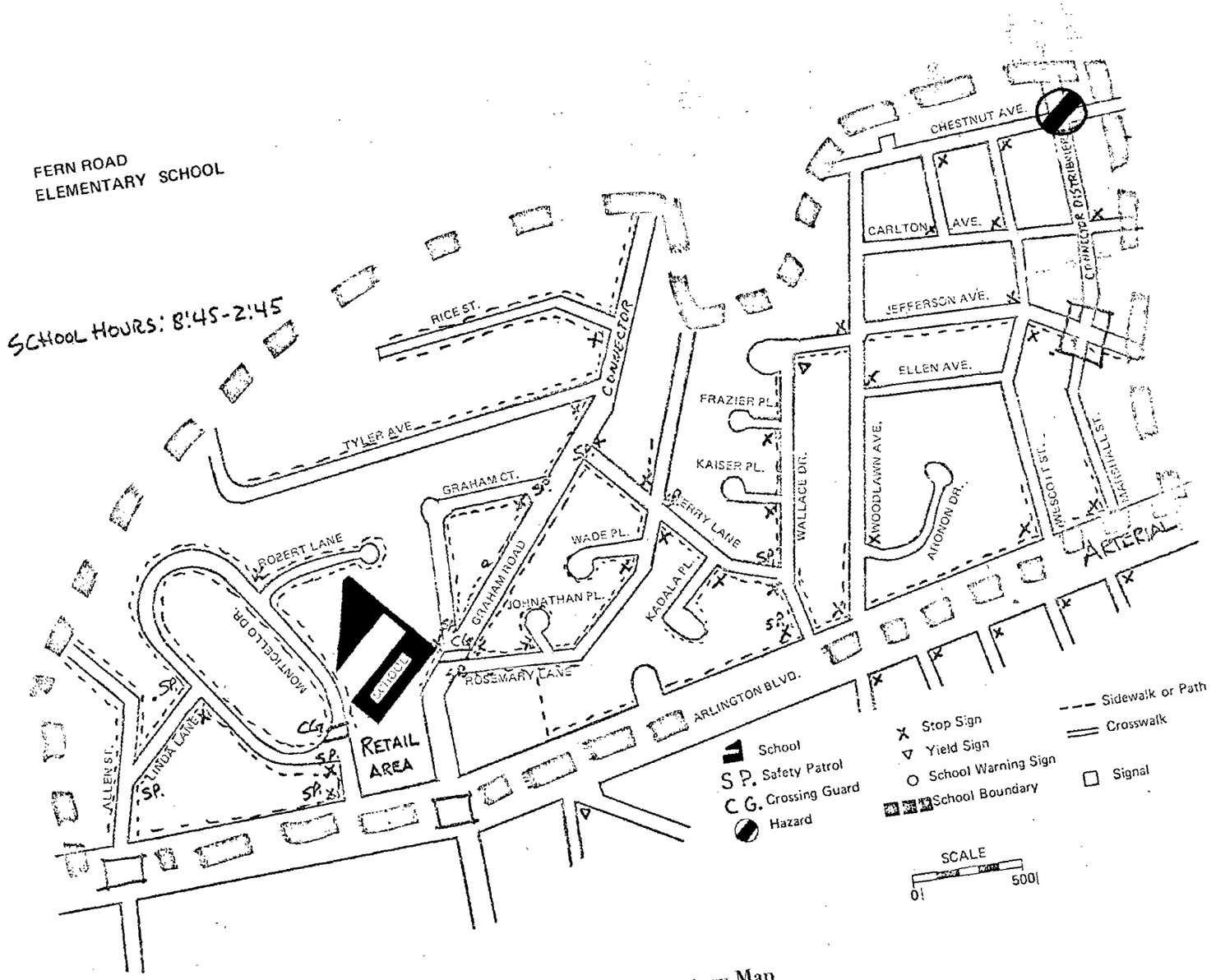


Figure 5. Field Inventory Map

Step 5. Complete the Inventory Map

The purpose of this step is to consolidate and supplement the information gathered in meeting with the school principal and performing the field inventory.

The traffic engineer should review all notes and the map resulting from Steps 3 and 4 for completeness. Office records should be used to supplement the information gathered. For example, suppose the principal had indicated that he had received parental complaints about a particular intersection being unsafe and that the traffic engineer during his inventory had observed students having to wait an excessive amount of time to cross. The traffic engineer should check the accident records, for that intersection as well as the timing of the signal (if one was present) to determine if some corrective action was warranted. He may also return to that intersection to conduct a traffic count and gap study to further supplement his information.

Other types of supplementary information might include traffic volumes, observed speeds, plans for near future traffic control device changes, and plans for sidewalk construction (the last item might require coordination with another agency).

Supplementary information should be noted on the field inventory map, so that all of the pertinent information is consolidated and displayed. Next, hazardous locations should be marked and reviewed. Modifications may be appropriate at these hazardous locations, e.g., installation or removal of traffic signals, signs, markings, sidewalks, etc. Any decisions made in this regard must be weighed in terms of need, alternatives, budget and local constraints.

The inventory map, although somewhat crowded at this point, will provide the necessary input for executing Step 6, the development of the safest routes. See Figure 6 for an example of the final inventory map.

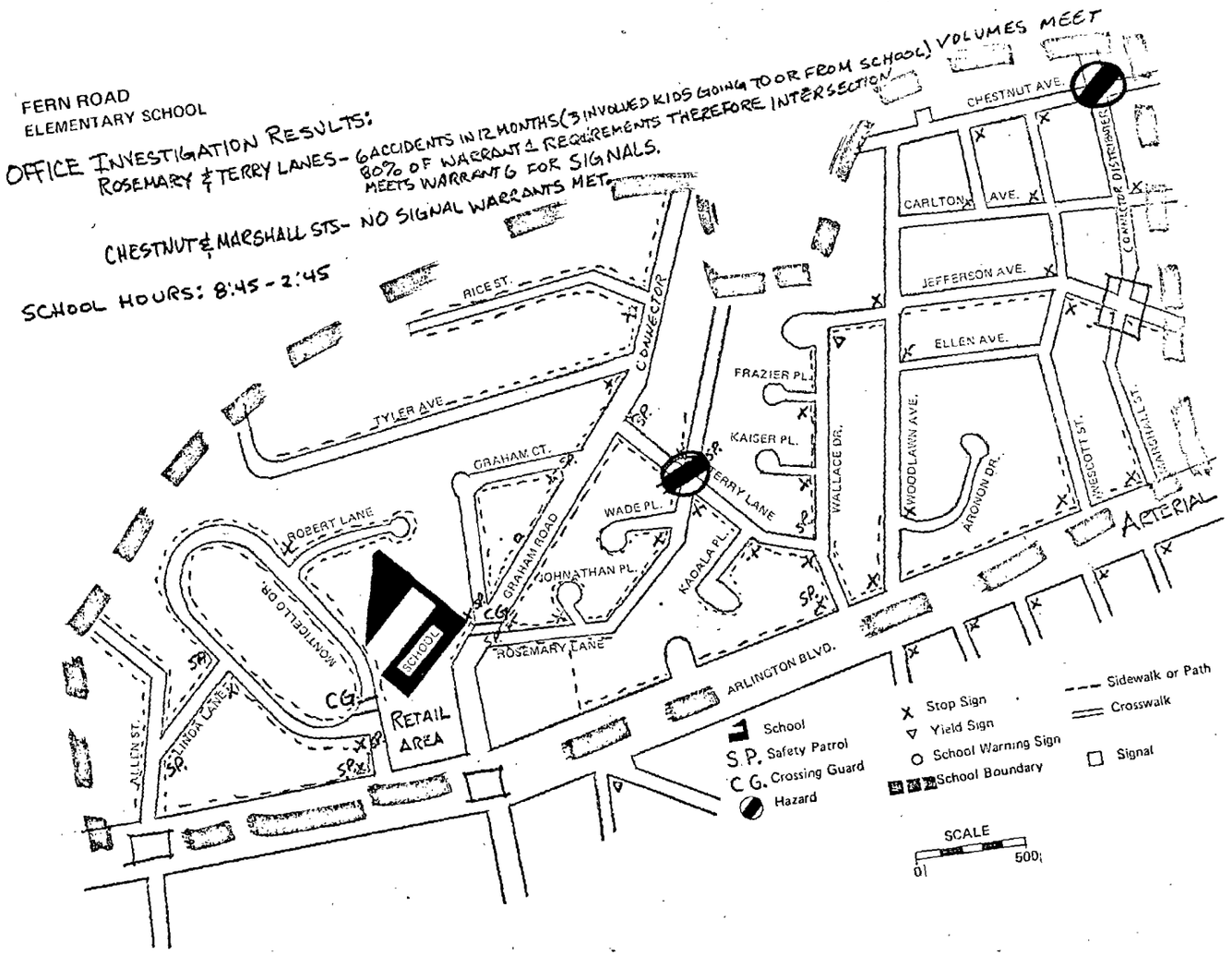


Figure 6. Completed Inventory Map

Step 6. Develop Safest Routes

The purpose of this step is to synthesize the information obtained previously and formulate easily understandable safe walking routes.

Using the information from the inventory map, along with engineering judgment, mark the safest routes on the inventory map following these general rules. Route children so they:

- Aggregate as soon as possible (a group is more readily seen by a motorist)
- Cross the fewest number of streets possible (aggregation serves to consolidate street crossing thus reducing vehicle-pedestrian exposures)
- Walk on sidewalks where available
- Walk the shortest possible distance on streets without sidewalks or wide shoulders
- Walk facing traffic on streets where there are no sidewalks
- Avoid high speed, high volume roadways
- Make maximum use of protective devices crossing guards, school patrols, traffic control devices
- Use easements with walkways through parks or other available areas.

The following factors should be considered in determining the safest crossing locations:

- Approach speeds
- Traffic and pedestrian volumes
- Road geometry (sight distance, curvature)
- Type of area (residential, commercial, industrial)
- Traffic control devices
- Availability of assistance measures (crossing guards, school patrols,)

Begin with the streets near the boundary lines and end at the school. Remember, existing traffic control devices may or may not be properly located with respect to the safest route to school. Do not feel constrained to making the routes conform to the existing devices if there is a safer alternative. Midblock crossings should be used only if they are either signalized or supervised (crossing guard or school patrol). Pedestrian accident statistics indicate that more pedestrian/vehicle conflicts occur in the afternoon than in the morning. Give consideration to the route home from school as well as the route to school. Last, but not least, make sure that the pedestrian routes at the school are well separated from car and bus loading and unloading areas. Figure 7 illustrates a safest route plan imposed on the inventory map of Figure 6.

FERN ROAD
ELEMENTARY SCHOOL

OFFICE INVESTIGATION RESULTS:

ROSEMARY & TERRY LANES - 6 ACCIDENTS IN 12 MONTHS (3 INVOLVED KIDS GOING TO OR FROM SCHOOL.) VOLUMES MEET 80% OF WARRANT 1 REQUIREMENTS Therefore INTERSECTION MEETS WARRANT 6 FOR SIGNALS.

CHESTNUT & MARSHALL STS. - NO SIGNAL WARRANTS MET.

SCHOOL HOURS: 8:45 - 2:45

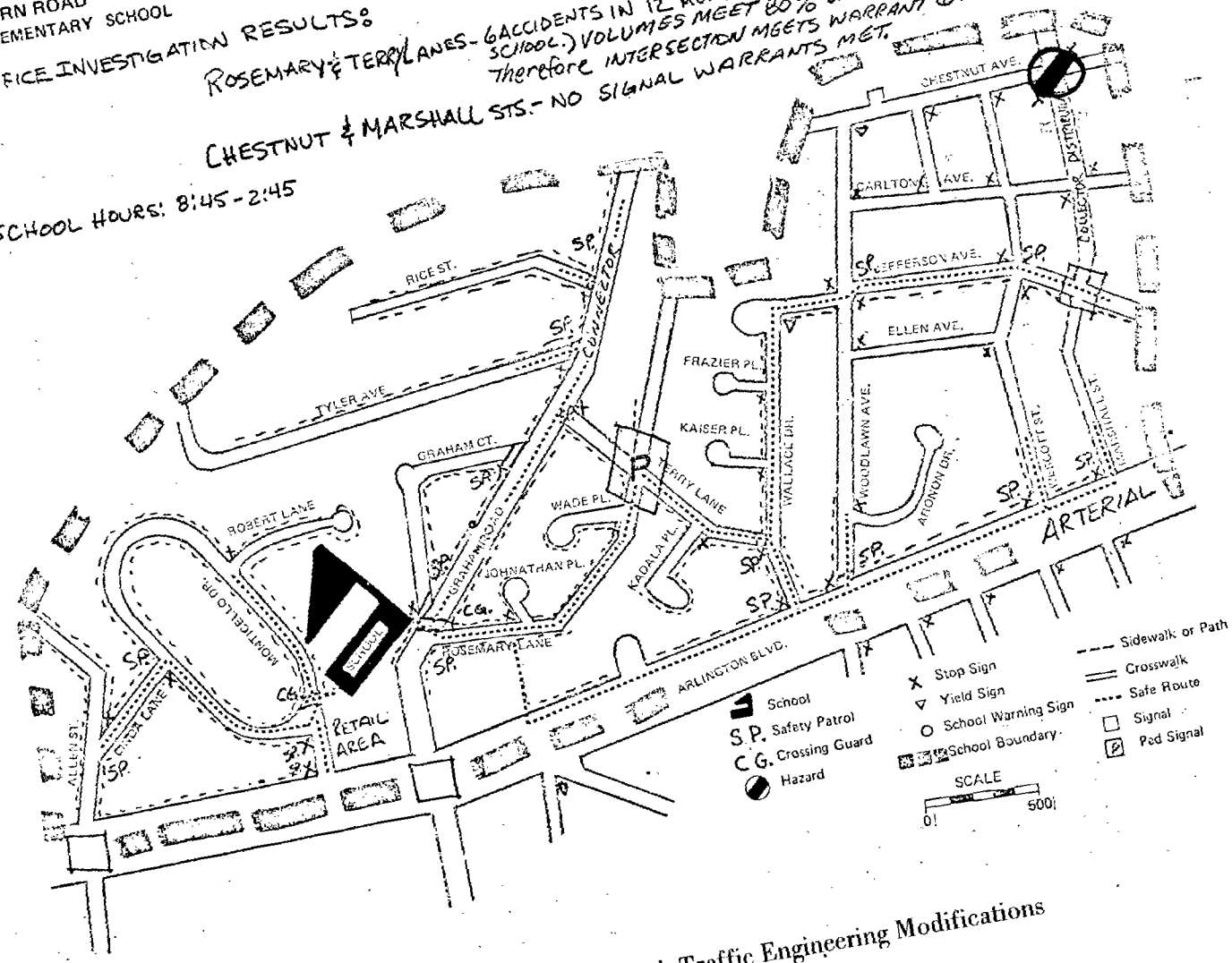
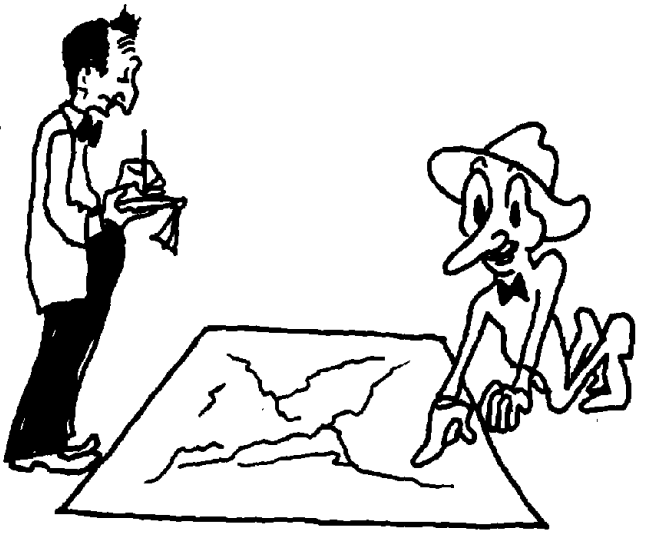


Figure 7. Safest Route Plan with Traffic Engineering Modifications

Step 7. Meet With the School Principal

The safest route plan completed in Step 6 should be presented and discussed with the school principal. Any changes should be discussed until both the principal and the traffic engineer agree on the safest routes. Plans should then be made for implementing the final handout maps that will be developed in the next step. These plans should include distribution of the maps, meetings with the PTA and teachers instruction on the use of the maps and evaluation of the program.



Step 8. Develop the Handout Maps

This step is divided into two sections. Section "A" covers the "state of the art" in safe walking trip maps. It includes examples of maps which are being used in various jurisdictions. These maps are not being recommended. They merely serve as examples of existing practices.

Section "B" presents some recommended practices. This is done through a series of alternative approaches to safe route maps.

Part A. State of the Art

The safest route plan map created in Step 6 will be used to develop the final handout map. It is vital to the success of the program that the handout maps be easily understood by everyone. This means that, if necessary, it must be printed in color, printed in several languages, segmented into areas, and simplified in every way possible. All of these decisions are dependent on the size and type of area to be included on the map and the available resources for printing the maps.

Existing Maps. The following are examples of handout maps which have been and are being used by different areas. These example maps are not being recommended. They are presented here to give the reader an insight as to the present state of the art. (see Figures 8 through 16).

Most of these maps are too complex. They attempt to show more information than is necessary for the individual parent and student. The reason for the complexity of these maps is that, they present the information (entire school district) which the traffic engineering departments, school principals, planning departments, PTA's and police departments need all on one map.

These maps are required to permit planning and discussions between the groups described. They are too complex for the individual parent and student. The parent and student does not need to know that a street *on the other side of the school district* is one way, is on the safest route, that it has a traffic control device on its corner, or that it has sidewalks on both sides.

Some maps show one way streets with arrows and then use arrows again to depict the safest routes. Studies show that the parents who would normally teach their children proper, safe routes to school are the largest users of the map. Those parents who would not normally walk their children to school do not do so when provided the safest route maps. One of the reasons for this may be the complexity of the maps and the inability of parents to interpret these maps. It is therefore essential that the maps be easily understood. The handout maps should provide only the information that is essential to conveying the location of the safest route to the parent and student.

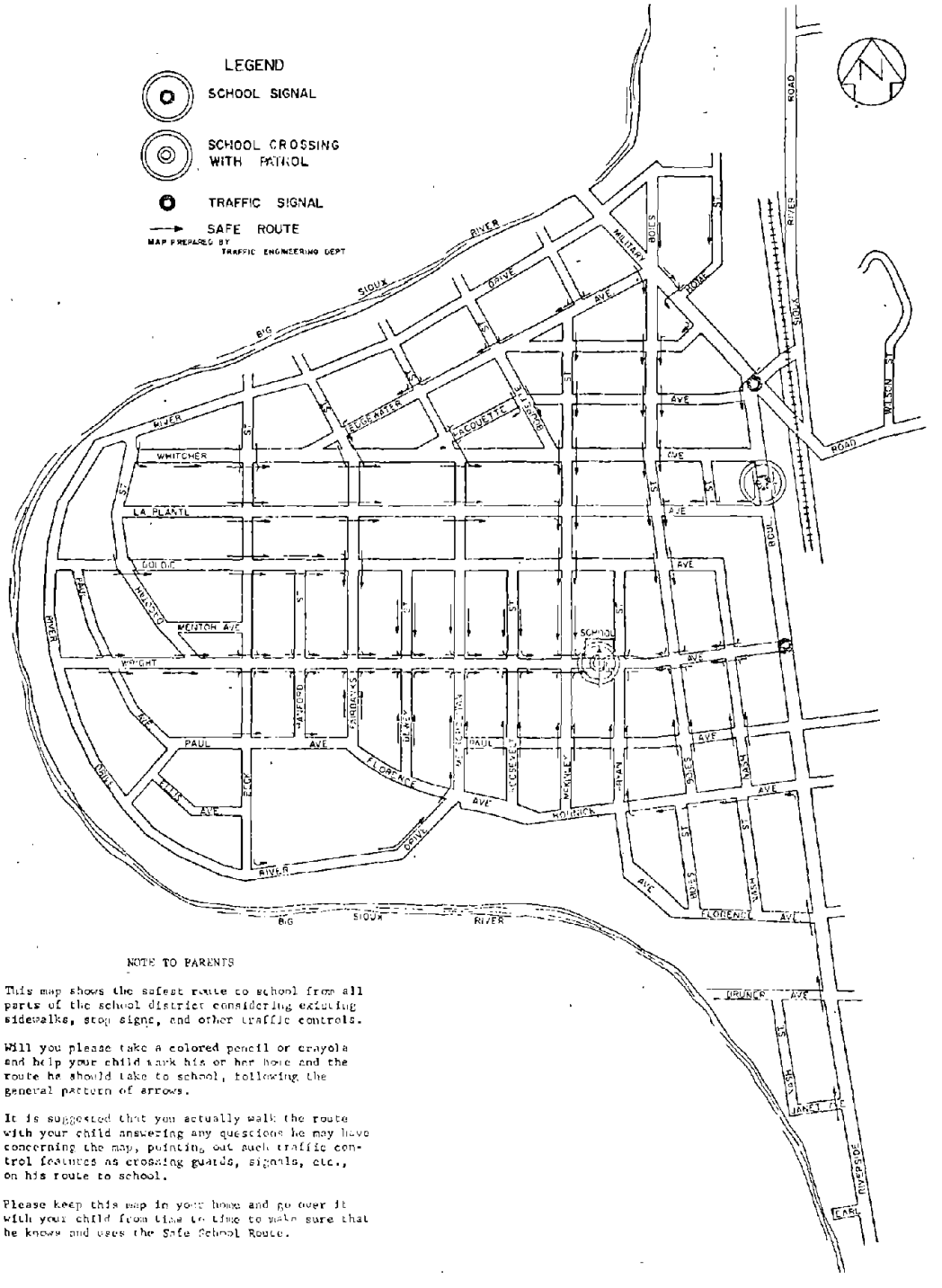


Figure 8. Example Map Number 1
(FOR ILLUSTRATIVE PURPOSES ONLY)

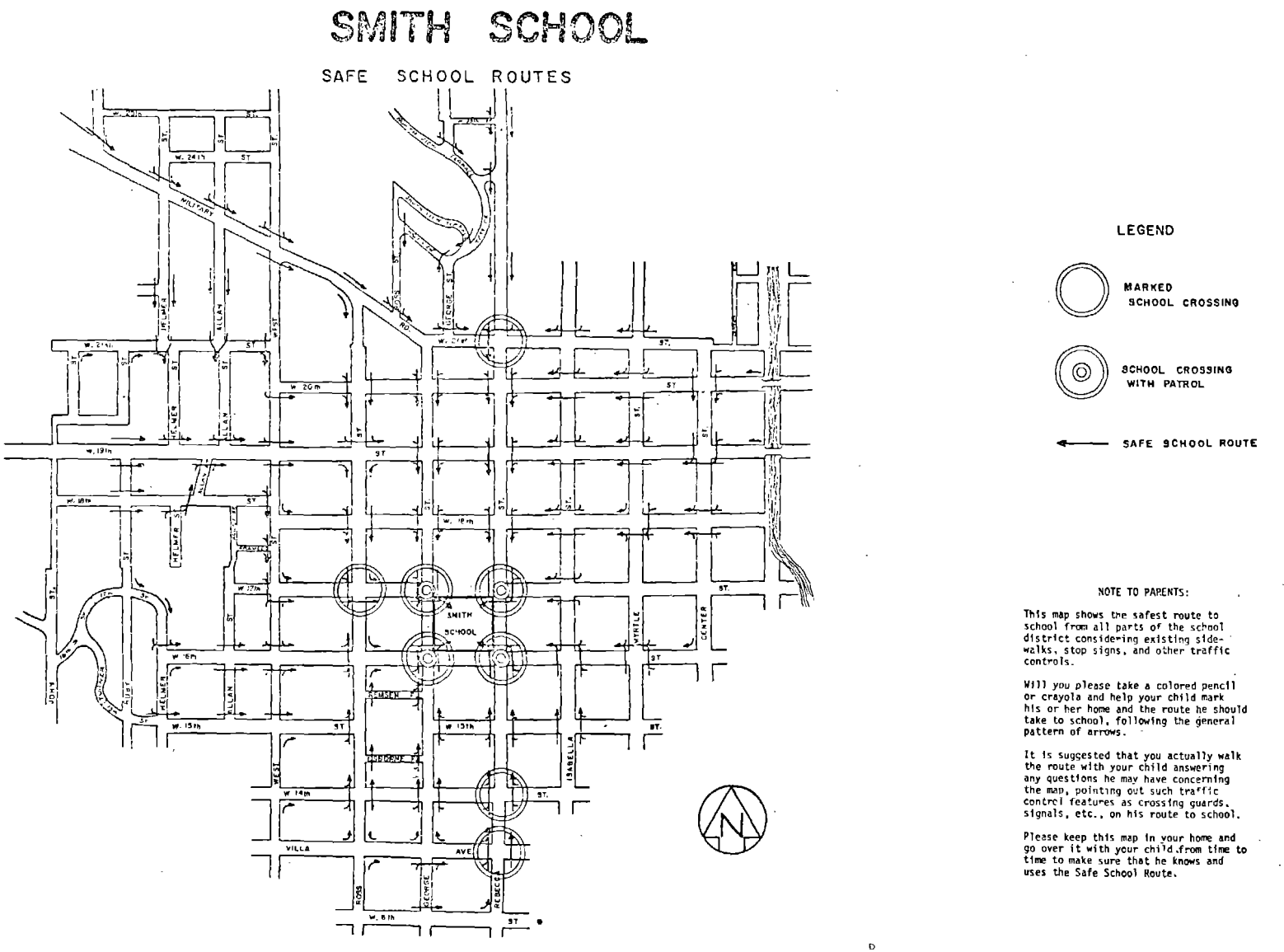


Figure 9. Example Map Number 2

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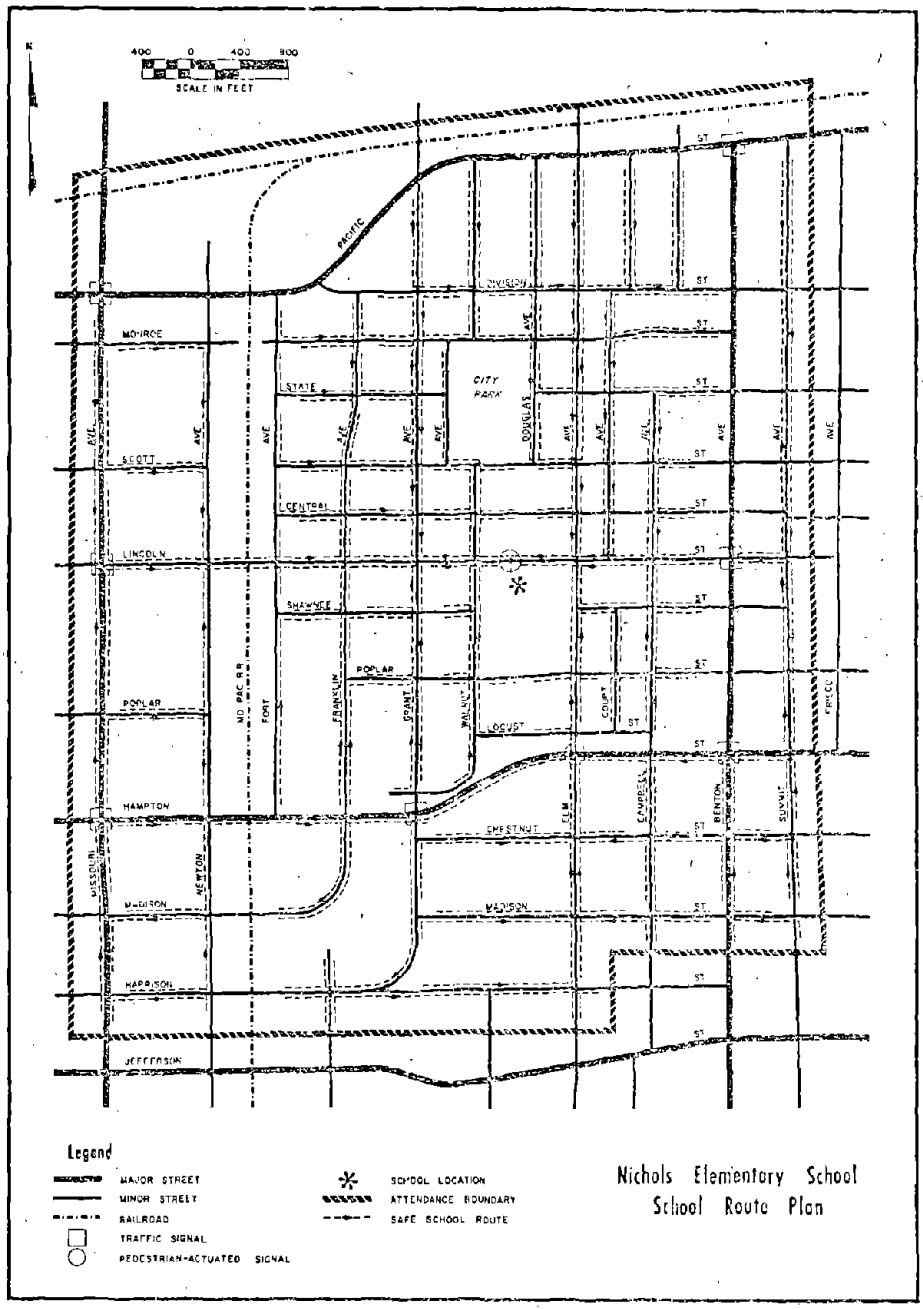


Figure 10. Example Map Number 3

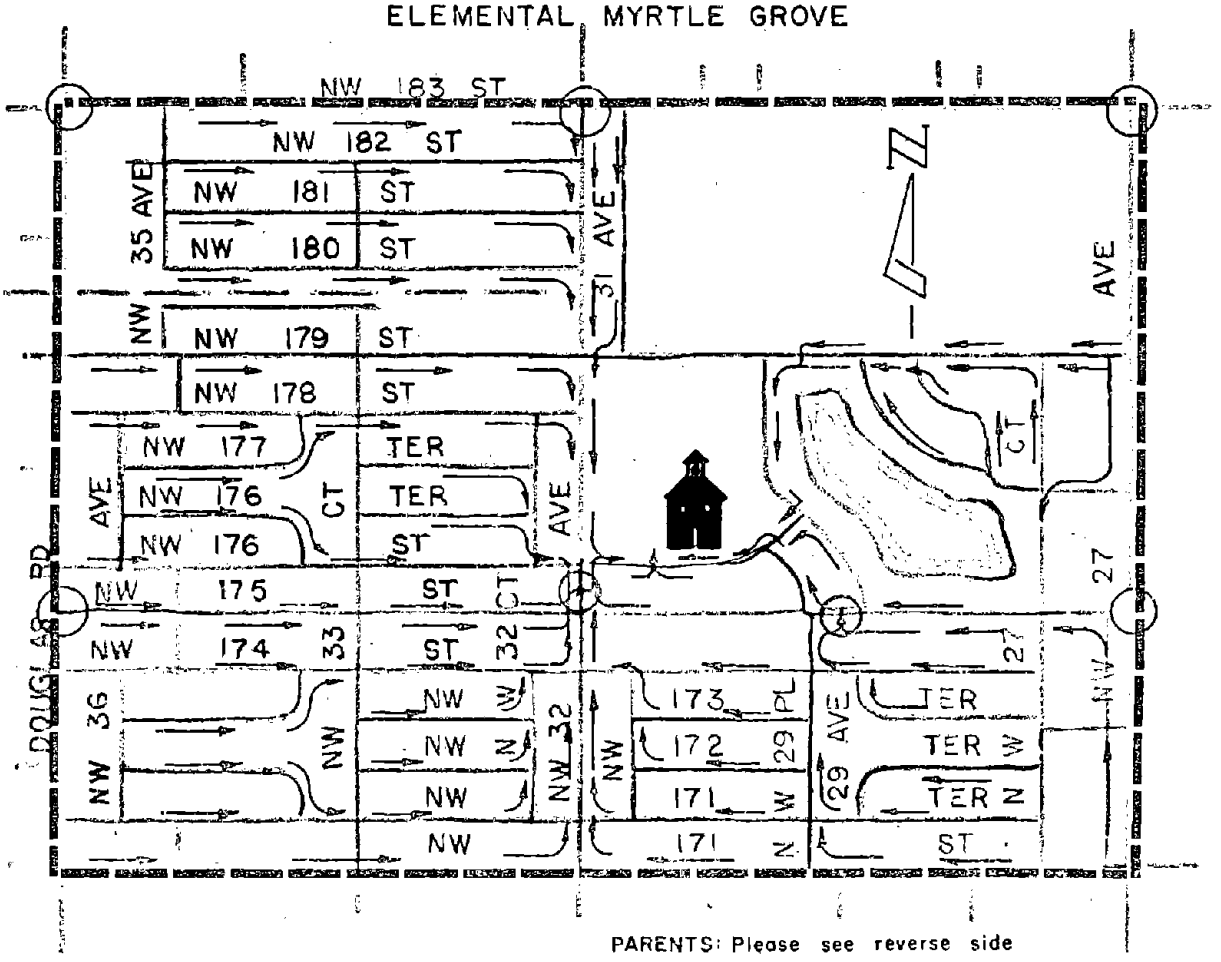
(FOR ILLUSTRATIVE PURPOSES ONLY)

SAFE ROUTE TO SCHOOL

MYRTLE GROVE ELEMENTARY

RUTA MAS SEGURA PARA LLEGAR A LA ESCUELA

ELEMENTAL MYRTLE GROVE



PARENTS: Please see reverse side

PADRES DE FAMILIA: Favor ver al dorso

LEGEND (LEYENDA)

- TRAFFIC SIGNAL (SEÑAL DE TRAFICO)
- SAFE ROUTE TO SCHOOL (RUTA MAS SEGURA)
- SCHOOL BOUNDARY (LIMITES DE LA ESCUELA)

Figure 11. Example Map Number 4

(FOR ILLUSTRATIVE PURPOSES ONLY)

PARENTS:

The map on the reverse side of this sheet shows the suggested safest route to school from every location in your school area. By following the arrows, you will be able to determine the best route between your home and the school. Mark the route with a pencil, pen, or crayon. This is the route your child should take to and from school. Crossing points for major streets have been located at established locations (i.e. at traffic signals or signed crosswalks). As a result, in some cases, the safest route is not the shortest route.

Instruct your child to use this route and to cross streets only at the locations shown. You and your child should become familiar with the route by walking it together. When walking the route, the following procedures should be used:

1.) Use sidewalks or safety paths if available; walk facing traffic if there are no sidewalks or safety paths; cross corners at right angles; wait on the curb until the traffic clears before crossing any street; walk - don't run across the street.
2.) If there are any traffic signals along the route, explain the meaning of the signals; explain the proper time to cross the street, and, the proper use of pedestrian push buttons if there are any.
3.) Speak each decision aloud, reviewing each factor considered. Be sure your child understands why and not just what to do.
4.) Time your trip in order to know how much time is necessary for your child to walk to school without hurrying.
5.) Once you reach the school, let your child walk you home.
6.) Correct any mistakes your child makes as you proceed on the way home.
7.) At one corner on the way home have your child cross the street alone to demonstrate his or her ability to follow your instructions.

A LOS PADRES DE FAMILIA:

El mapa que aparece al dorso muestra la ruta que se sugiere como la más segura desde cualquier punto en su área escolar para llegar al colegio. Siguiendo las flechas, Ud. podrá determinar la mejor ruta entre su casa y el colegio. Marque la ruta con lápiz, pluma o creyón. Esta es la ruta que su niño o niña deben seguir para ir y venir al colegio. Los puntos en que hay que atravesar las calles principales han sido escogidos en localidades establecidas (por ejemplo, donde hay semáforos o cruces para peatones). Como resultado, en algunos casos pudiera ser que la ruta más segura no fuera precisamente la más corta.

Dele instrucciones a su niño o niña para que use esta ruta y para que cruce las calles solamente en las localidades marcadas. Ud. y su niño o niña deben familiarizarse con la ruta recorriéndola juntos. Cuando caminen por dicha ruta se debe seguir el procedimiento descrito a continuación:

1.) Camine por las aceras o pasos de seguridad cuando estos existan; camine de frente al tráfico en caso de que no hubiere aceras o pasos de seguridad; atraviese las esquinas en ángulo recto; espere en el contén hasta que el tráfico permita atravesar la calle; camine - nunca corra al atravesar una calle.
2.) Si hay algún semáforo a lo largo de la ruta, explique el significado de las distintas luces; explique cuál es el momento adecuado para atravesar la calle y el uso apropiado de los botones para peatones en caso de que éstos se encuentren instalados.
3.) Explique cada decisión en voz alta, repitiendo cada uno de las factores a considerar. Asegúrese de que su niño o niña entiendan qué es lo que tienen que hacer y por qué es que lo tienen que hacer.
4.) Mida el tiempo que lleva el viaje para que Ud. sepa cuánto demora el caminar al colegio sin necesidad de apurarse o correr.
5.) Una vez que lleguen al colegio, permita que su niño o niña le muestre la ruta de regreso.
6.) Corrija los errores o faltas que su niño o niña cometa a medida que vayan de regreso a la casa.
7.) Cuando lleguen a una esquina en su viaje de regreso a la casa, haga que su niño o niña atraviesen la calle por sí solos para que demuestren si han aprendido a seguir las instrucciones.

Figure 12. Example Statement Provided with Example Map Number 4
(FOR ILLUSTRATIVE PURPOSES ONLY)

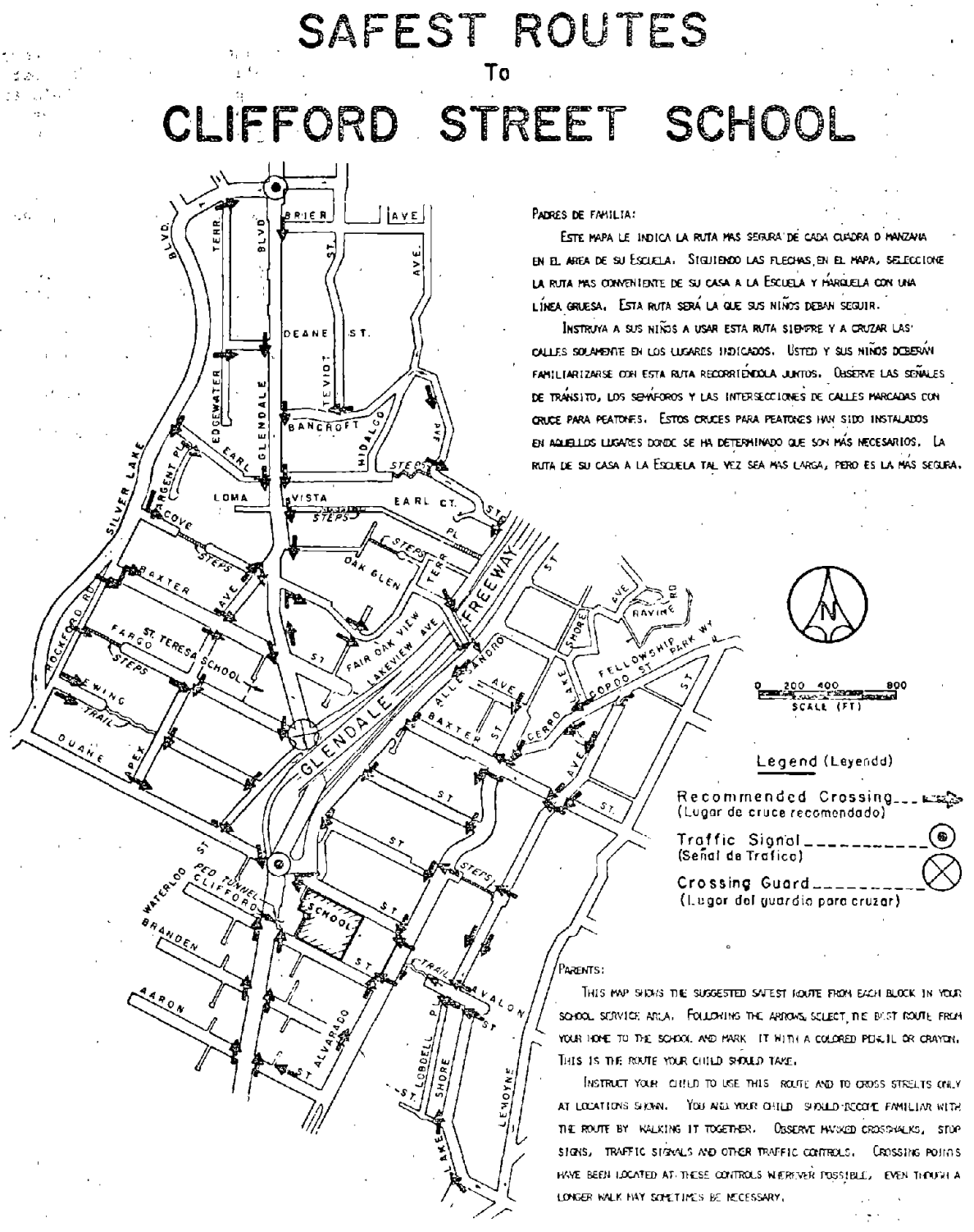


Figure 13. Example Map Number 5
(FOR ILLUSTRATIVE PURPOSES ONLY)

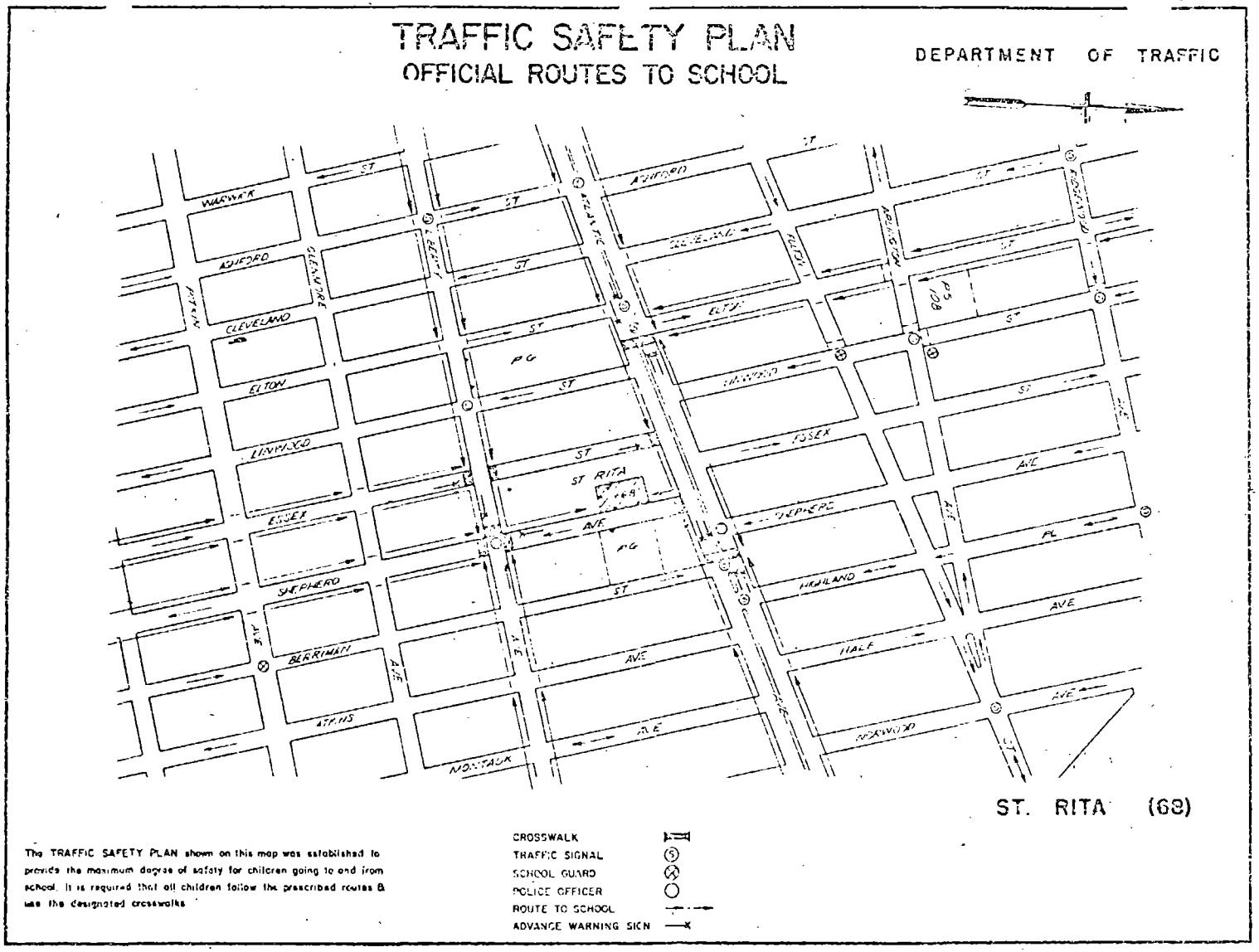


Figure 14. Example Map Number 6
(FOR ILLUSTRATIVE PURPOSES ONLY)

Figure 15. Example Map Number 7

(FOR ILLUSTRATIVE PURPOSES ONLY)

GUIDING RULES FOR GOOD PEDESTRIAN BEHAVIOR

1. Look both ways before crossing.
2. Walk, DON'T RUN across streets.
3. Cross only at safe corners, even if you walk farther.
4. Choose the route with fewest streets to cross.
5. When possible, cross streets where there are traffic helps.
6. Obey traffic signals.
7. Face traffic when walking on roads without sidewalks.
8. Watch for turning cars.
9. Keep from between parked cars.
10. Refuse to ride with strangers.
11. Go directly between home and school.

. . . . . INSTRUCTIONS . . . . .

1. FIND THE SCHOOL ON YOUR MAP.
2. FIND YOUR HOME ON THE MAP AND MAKE AN "X".
3. FIND THE SAFEST WAY TO SCHOOL USING PATH WHERE MARKED CROSSWALKS ARE AVAILABLE AT MAJOR INTERSECTIONS OR WHERE ADULT CROSSING GUARDS ARE STATIONED, IF YOU MUST CROSS THAT STREET.
4. PLOT THE SAFEST PATH, USING SMALL ARROWS ORIGINATING AT YOUR HOME AND MARKED ON THE SIDE OF THE STREET WHERE YOU WALK.

THIS APPROACH OF NOT SPECIFYING THE SAFE ROUTE IS NOT RECOMMENDED

Figure 16. Statement Provided with Example Map Number 7

(FOR ILLUSTRATIVE PURPOSES ONLY)

Part B. Recommended Alternative Practices

Reducing complexity is the main task in creating the final handout map to be used by students and parents. There are several methods which can be utilized in reducing complexity. The key concept is to present only the most relevant information to students and parents. This information includes the safest route, the school building, and the students home. The possibilities for use of color, line weight, size, and symbols are practically infinite. Presented in this section are some examples of basic handout maps. These maps illustrate some of the basic ideas and alternative methods of creating more simple map presentations.

One manner of reducing complexity on the map is to only present the safest walking streets. See Figure 17 on the opposite page.

If you feel that you must present a great deal of information on the map, be certain that each graphic symbol, line weight, and/or color varies with the specific item being displayed. DO NOT USE ONE SYMBOL OR COLOR TO REPRESENT TWO DIFFERENT ITEMS. Be imaginative in displaying the safest routes. Arrows may not be the most effective method of showing the safest routes. Several alternative map presentations have been devised and are presented for your consideration. Figures 17, 18, and 19 show three ways of presenting all the safest routes for one school on a single handout map. This map is easy to produce and distribute as all of the information for all students is contained on a single sheet. The disadvantage is that the map may be confusing to parents and students.

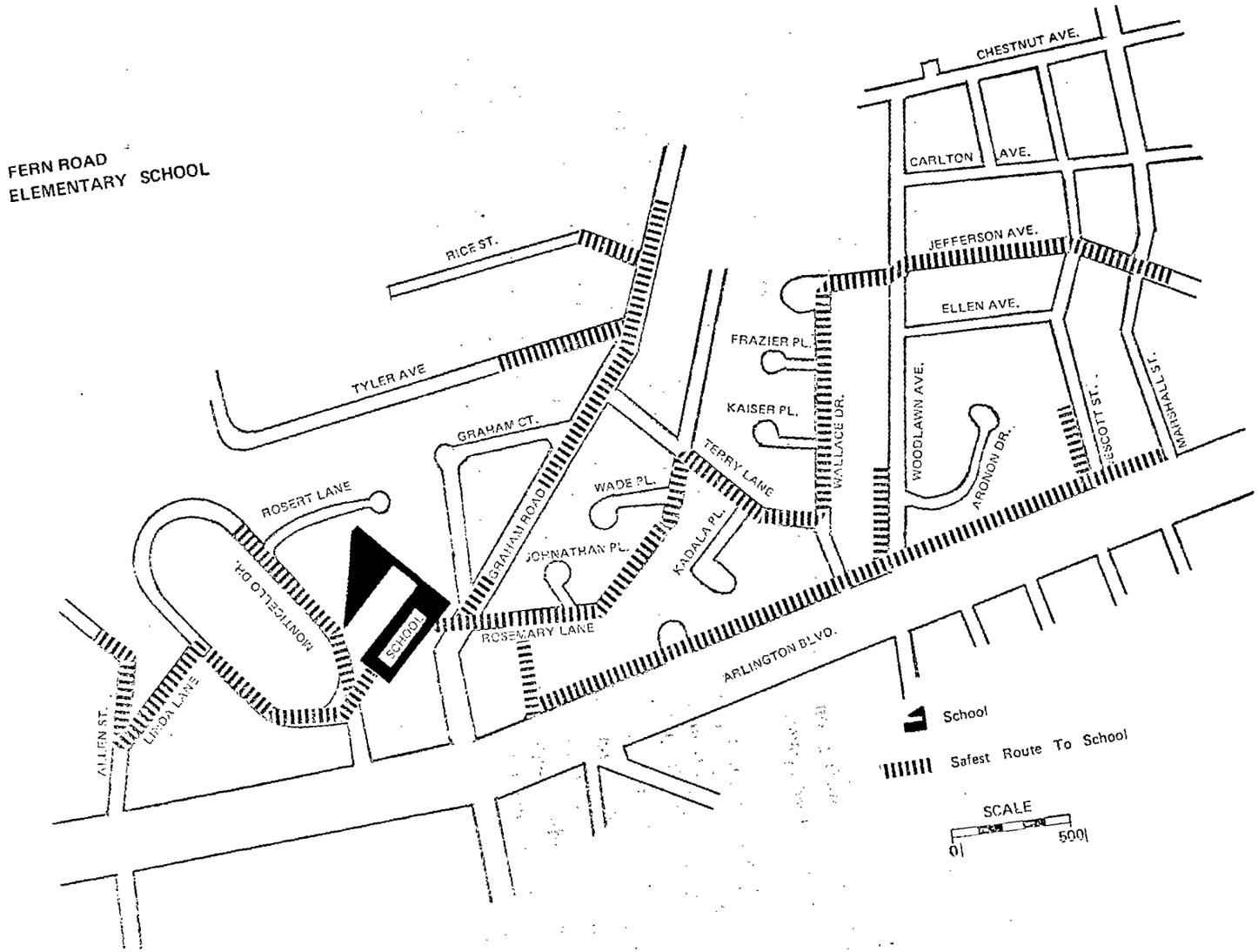


Figure 17. Alternative Map Number 1

Another manner of reducing complexity is to present the minimum number of required arrow "guides". See Figure 18 on the opposite page.

NOTE:

This method is not recommended for use in areas without sidewalks unless separate maps with arrows are used for the trip from school as well as for the trip to school. This is required to permit the child to be facing traffic when walking in areas without sidewalks.

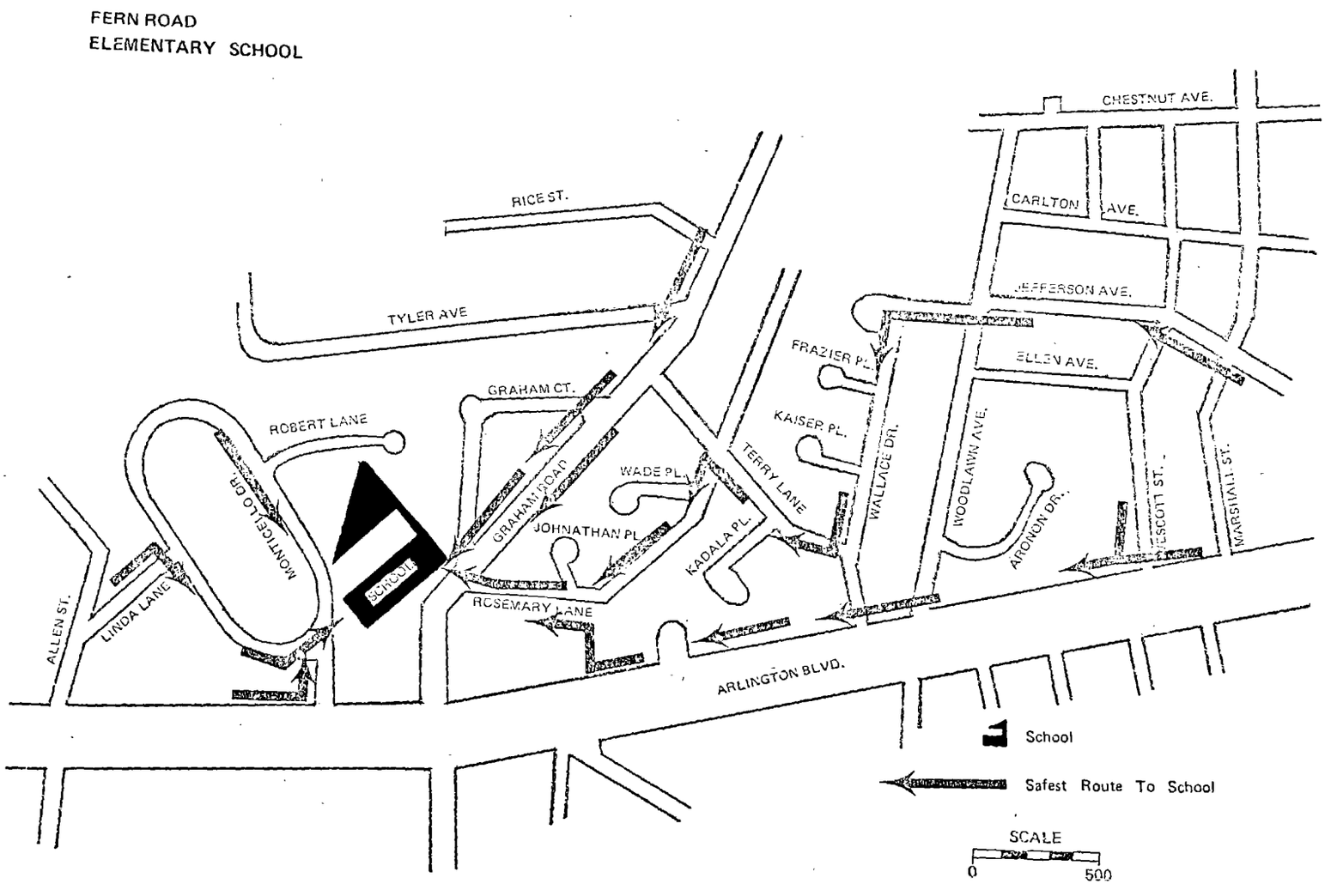


Figure 18. Alternative Map Number 2

When deemed necessary, both the safest streets and the arrow "guides" can be presented as long as the map is kept uncluttered. See Figure 19 on the opposite page.

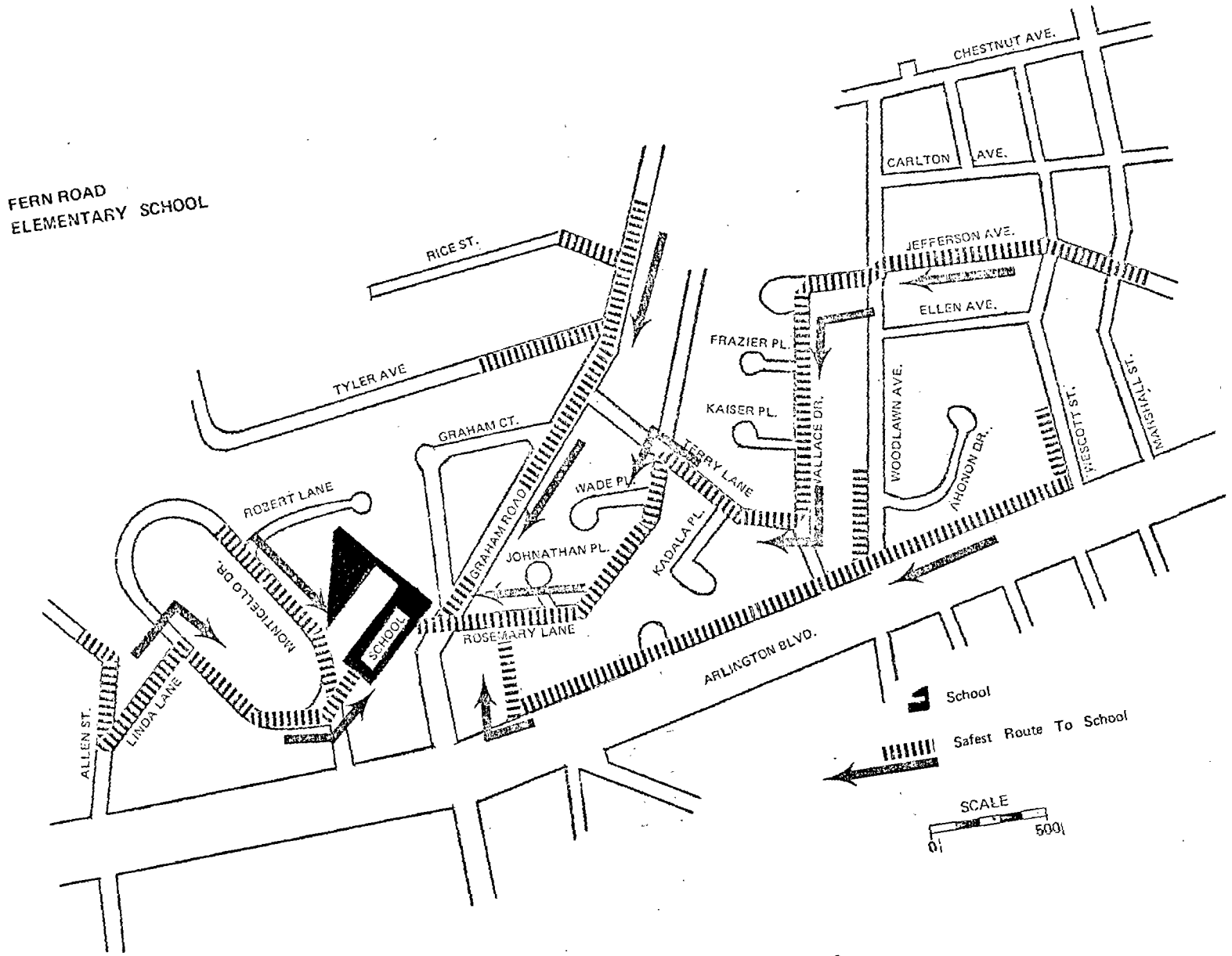


Figure 19. Alternative Map Number 3

Another alternative is to break the school area into several sections containing the major safe routes. In this way, the parent and child are not faced with trying to understand a complete safe route plan. Figures 20, 21, 22, and 23 show an alternate way of presenting the four safest routes for the same school area. The area is first divided into sections. The safest route for each section is shown by a black and white line. The area serviced by that route is shown by a grey pattern. Thus, there is a separate map for each route. The advantage of this method is simplicity. Only the information relating to a specific segment of the school walking population is shown. The cost difference between this method and the single map method is not significant; however, the distribution of the single route maps is more complex in that each route map must be matched with the students living in the area served by that route.

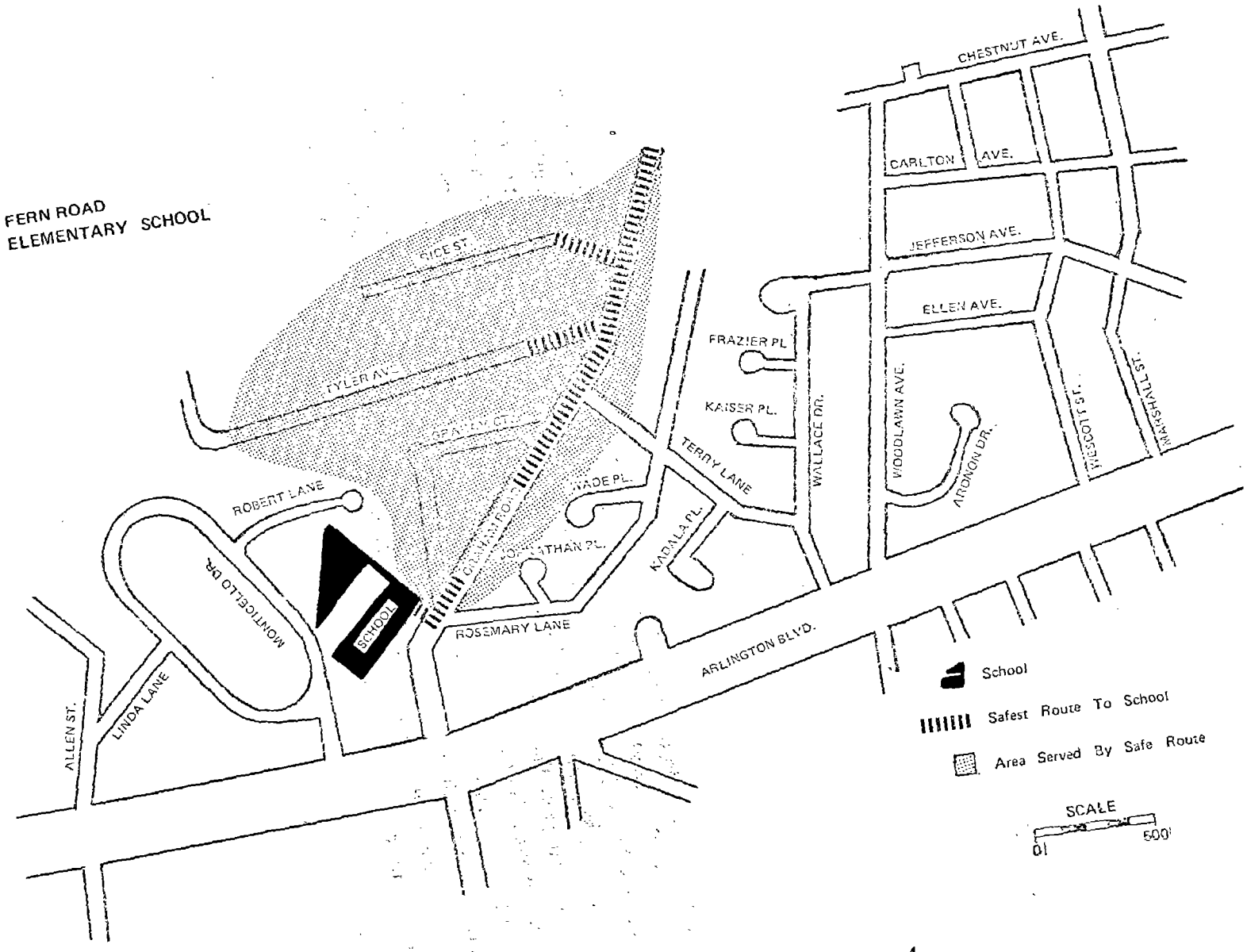


Figure 20. Sectioned Alternative Map Number 4

The grey areas on these sectional maps permit identification of the school area served by a major safe route. Each map should be distributed to the students residing in the grey area shown on that map.

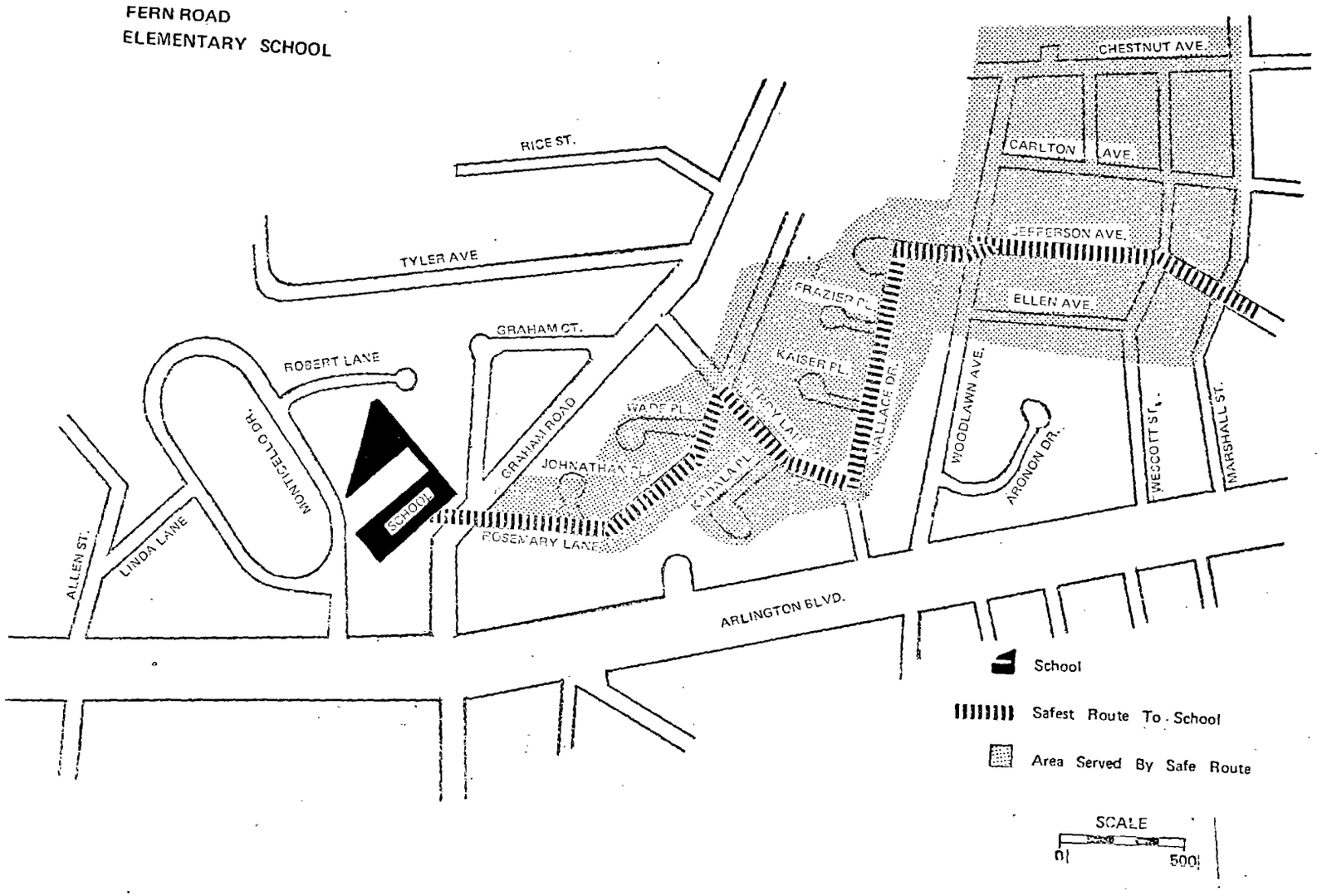


Figure 21. Sectioned Alternative Map Number 5

The use of the grey area is shown here to illustrate a manner of dividing the entire school area into manageable sections. If you feel that in your jurisdiction the use of the grey area will tend to confuse parents then it may be elliminated and only the safest route should be presented on the map.

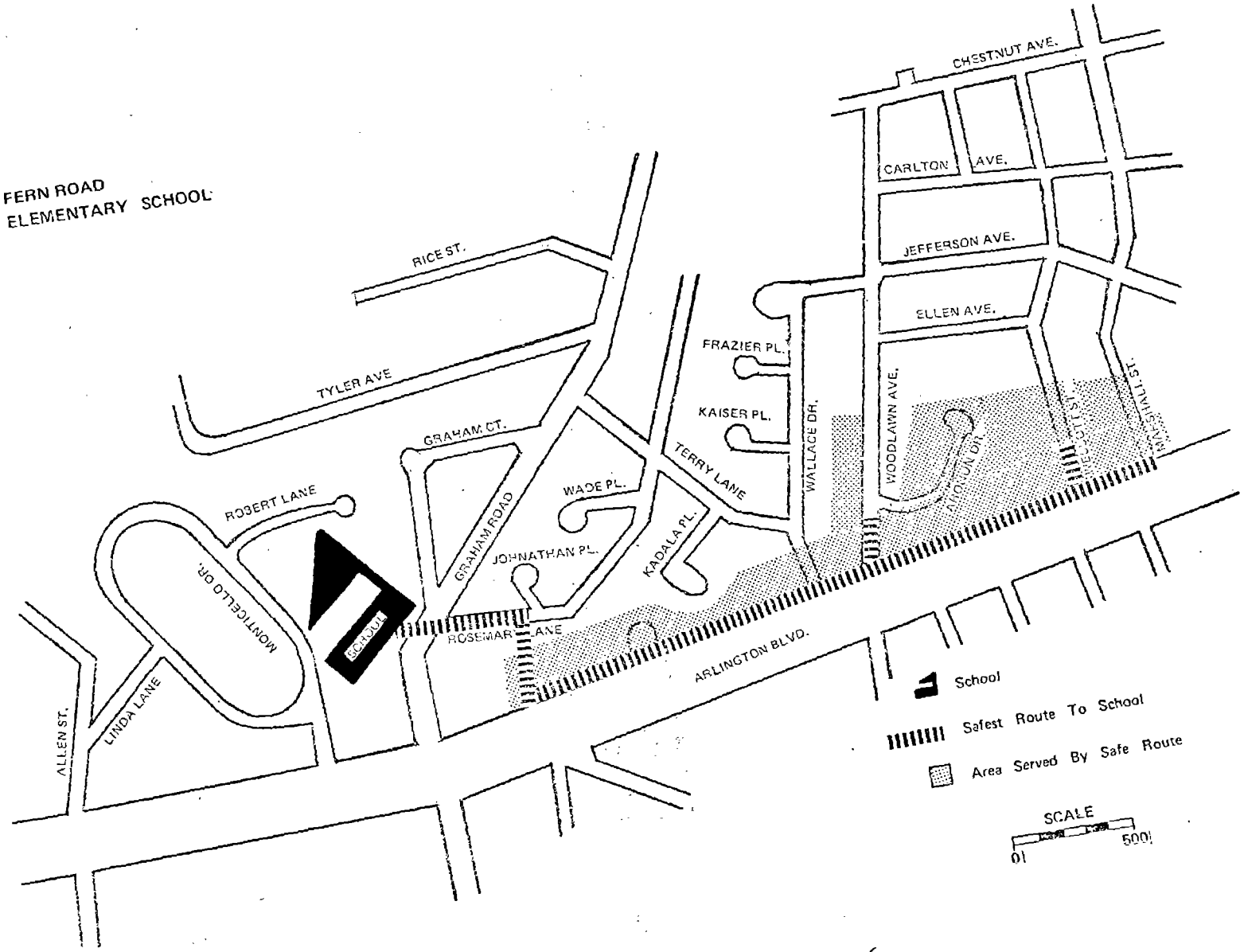


Figure 22. Sectioned Alternative Map Number 6

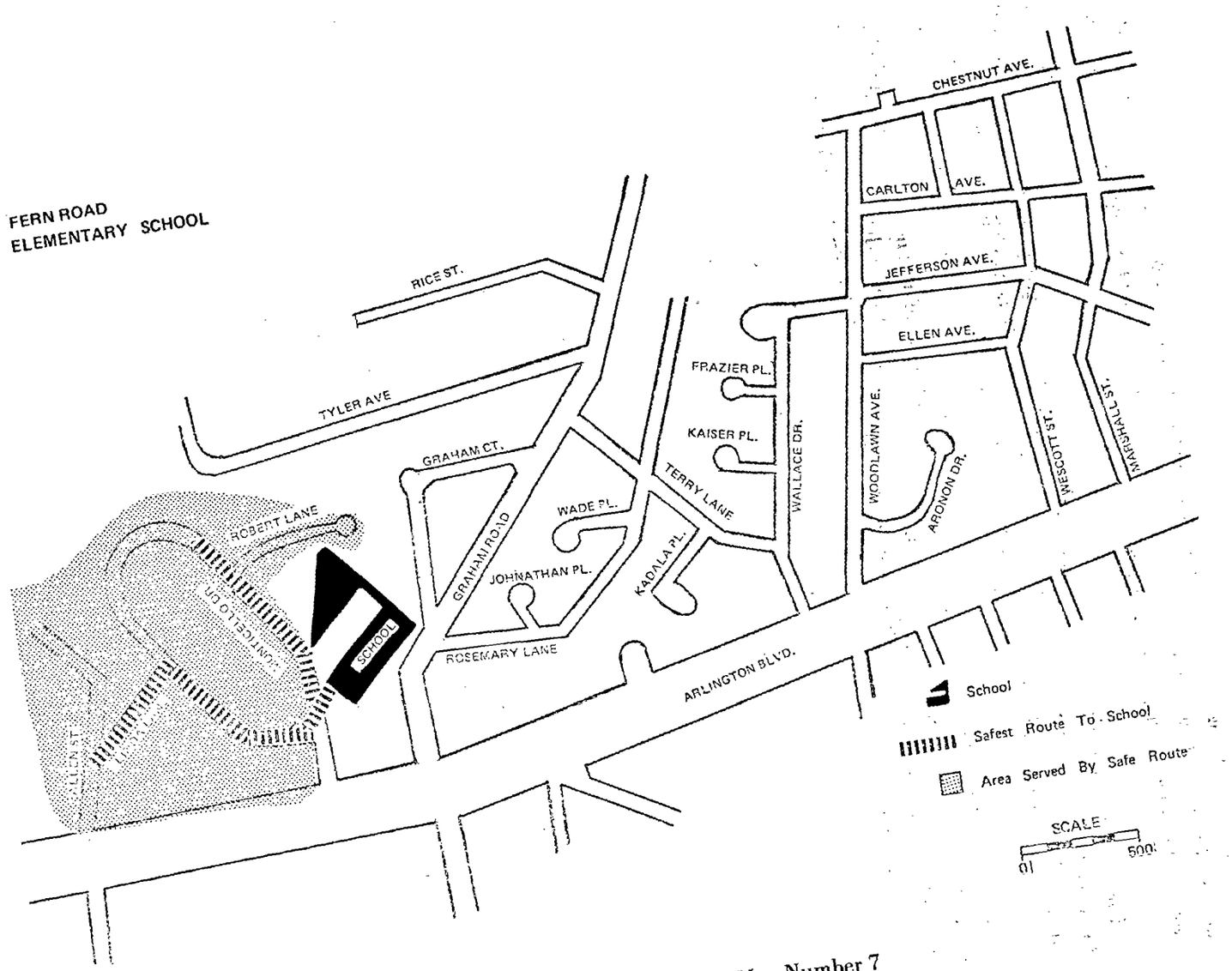


Figure 23. Sectioned Alternative Map Number 7

Figure 24 (next page) presents the least complex Alternative. This map shows only the safest route for the students who reside in the section of the school area presented. This concept is most desirable and is a recommended alternative.

The concept of creating several maps for each specific user group is highly recommended. Although the use of one map for all groups is least expensive, it offers much greater complexity and is therefore much less easily understood, and potentially underused.

The size of the budget, access to printing facilities, and the type of area being served are primary considerations in determining which of the above methods will best serve the specific needs of the community. The costs of several methods should be reviewed before making a final decision as to which method to use.

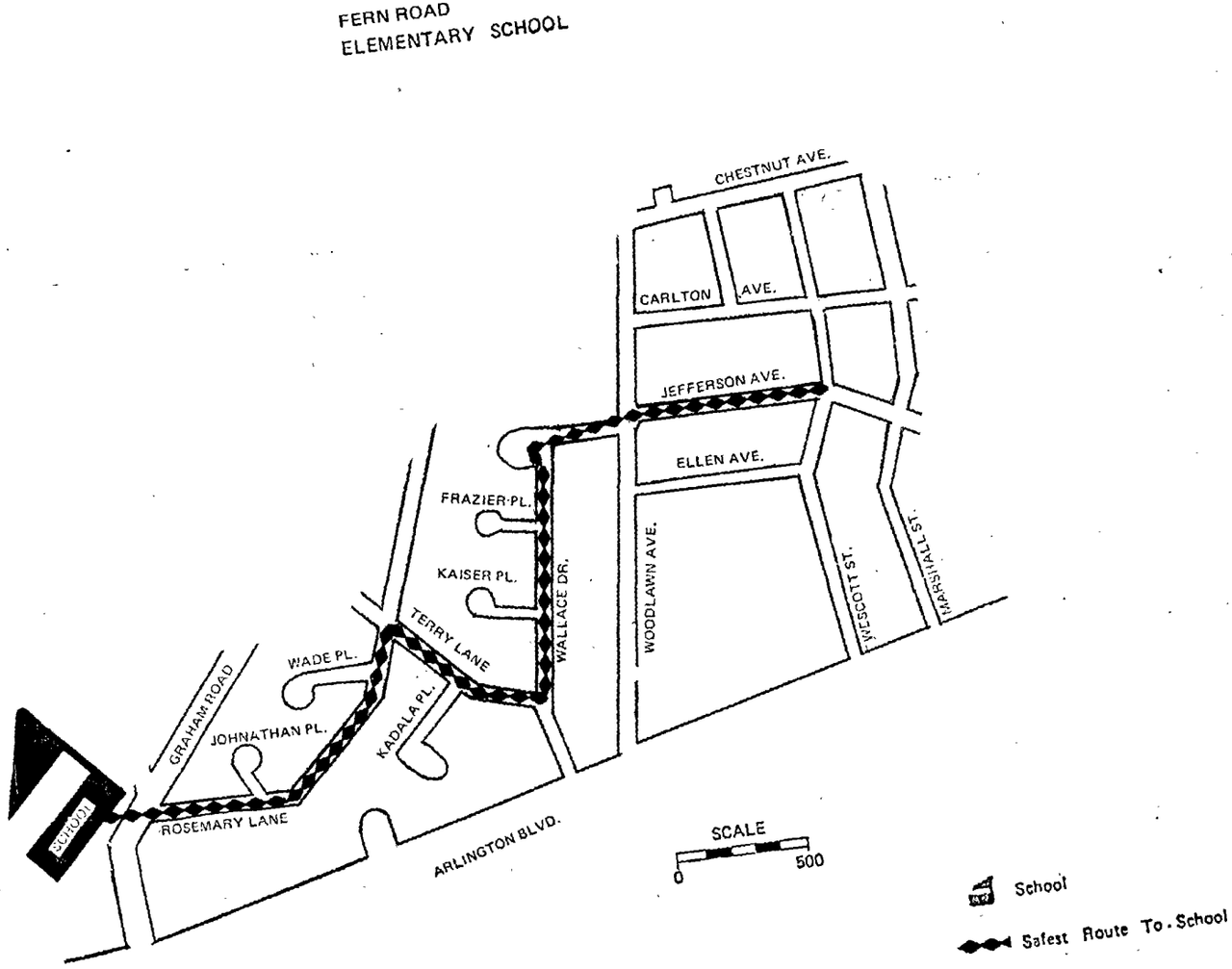


Figure 24. One Section Alternative Map Number 8

Step 9. Meet with the PTA

Once the handout maps are prepared, it is advisable that they be distributed and explained to the parents and teachers of the students.

The schools generally accept responsibility for the map distribution, but some areas already using a Safest Route to School Program have had difficulty in getting the cooperation of teachers and parents in distributing the maps. If the maps are not properly distributed, the success of the program will be severely handicapped. In order to avoid this handicap, it is strongly suggested that the traffic engineering department, the school, and the PTA be involved with the proper distribution of the maps. The method of distribution depends on the type of handout maps used.

A meeting should be called with the PTA to present the Safest Route Program, to explain how the handout maps are to be used and to answer questions.

Step 10. Evaluate the Program

In order to determine the effectiveness of the safest school route, it is necessary to conduct an evaluation. The evaluation is quantitative in nature in that the utilization of the handout maps is measured.

After the handout maps are distributed, a survey is conducted of samples from both the parent and student populations. A mailback survey questionnaire may be attached to the handout maps, or a mail-out questionnaire may be sent to the students' homes, or a door-to-door survey may be taken (the PTA may be helpful in this type of survey). The survey of the parents might include such questions as:

- Were the instructions with the map followed, i.e., did you walk the route with your child?
- Could you read and understand the map? If not, what confused you?
- Do you feel that this type of program improves the safety of your child's trip to and from school?

A survey of the students could be conducted in the classroom, and should address the following questions:

- Did your parents go over the map with you and/or walk the route with you?
- Do you now follow the route on the map when you go to and from school?
- Do you feel that the school route map program helps to make your trip to and from school safer?

These suggested questions should, of course, be reworded and/or expanded as required to sufficiently address each population. The program evaluation step is easily overlooked or omitted in an effort of this nature; however, it is a key element in making the program a complete and documented success. The traffic engineer should also carry out his normal evaluation of any traffic improvements made in the course of developing or updating the safest school route maps.

MAINTAINING THE PROGRAM

The Safest School Route Program does not stop with the completion of Step 10 because the program is not a one-shot event. To put the effort called for in the ten steps to establish the program and then to forget it is pure folly (and downright wasteful). (See Figures 24 and 25). The inventory map should be updated whenever a change to any of the data occurs. The handout maps should be reviewed and updated prior to distribution at the beginning of each school year. PTA involvement in the distribution and evaluation is recommended as an appropriate annual activity of the organization.

The Safe Route Map program is one program that is constantly changing. It changes with the seasons and from year to year. It changes as a sidewalk is constructed and when a group of houses are torn down. A good program should provide provisions for periodic reviews and revisions. It should have the ability to react rapidly to unanticipated events (e.g. acts of nature and man-made hazards – a truck overturns and inundates two blocks with flammable liquid, a stream overflows, etc.).

The program should provide the basis for tying in *to other programs:* unanticipated bussing due to *a temporary hazard:* teachers walking different routes with classes discussing mapping, geography, use of crosswalks, actuating traffic signals, crossing a street, etc.

Program maintenance involves the comprehensive effort of the traffic engineer, school officials, parents, teachers, police depts., planning depts., students, etc., to promote safer, more efficient school safety programs. Program maintenance incorporates periodic reviews of the area including:

- hazards
- traffic engineering data (including traffic counts)
- traffic controls (including driver visibility ie, foilage blocking view)
- sidewalk construction/school transportation
- changes to street network (traffic flow)
- new construction

Community education, awareness and participation in school safety programs is essential to their success. The following programs are considered part of program maintenance:

- Safety Patrol programs
- Safety Demonstrations
- Safety Education programs
- AAA Safety Programs

Another important element under program maintenance is publicity. Publicity can be utilized to inform, educate and enlist community support for school safety programs. Keeping the community informed and active in safety programs will add to the success of the programs.

The cost of maintaining programs can be shared by the community and private sectors. Private contributions should actively be solicited. The city of Long Beach, California is an exempliary city utilizing private support in its school safety program. Their safest route to school maps are jointly financed by the General Telephone Company of California and the Independent Insurance Agents of Long Beach. The maps are developed by the traffic engineer of the city. The school safety program is coordinated by the Long Beach Chapter of the National Safety Council in cooperation with the Unified School District, Long Beach Council of P.T.A.'s and the Seaside Printing Company. The solicitation of support from all sectors of a city is strongly recommended.

The program should provide the flexibility to accommodate future improvements and technological innovations. The most desireable walking trip map for the student and parent should indicate the unique routes to and from school from the individual student's house. The work involved on the part of the school system and the traffic engineer to provide uniquely individualized maps for each student, makes this presently economically infeasible. More advanced school systems presently using computerized school bus routing could, in the future, feed various safety criteria into the computer together with the students domicile and use a plotter to develop individual student walking maps.

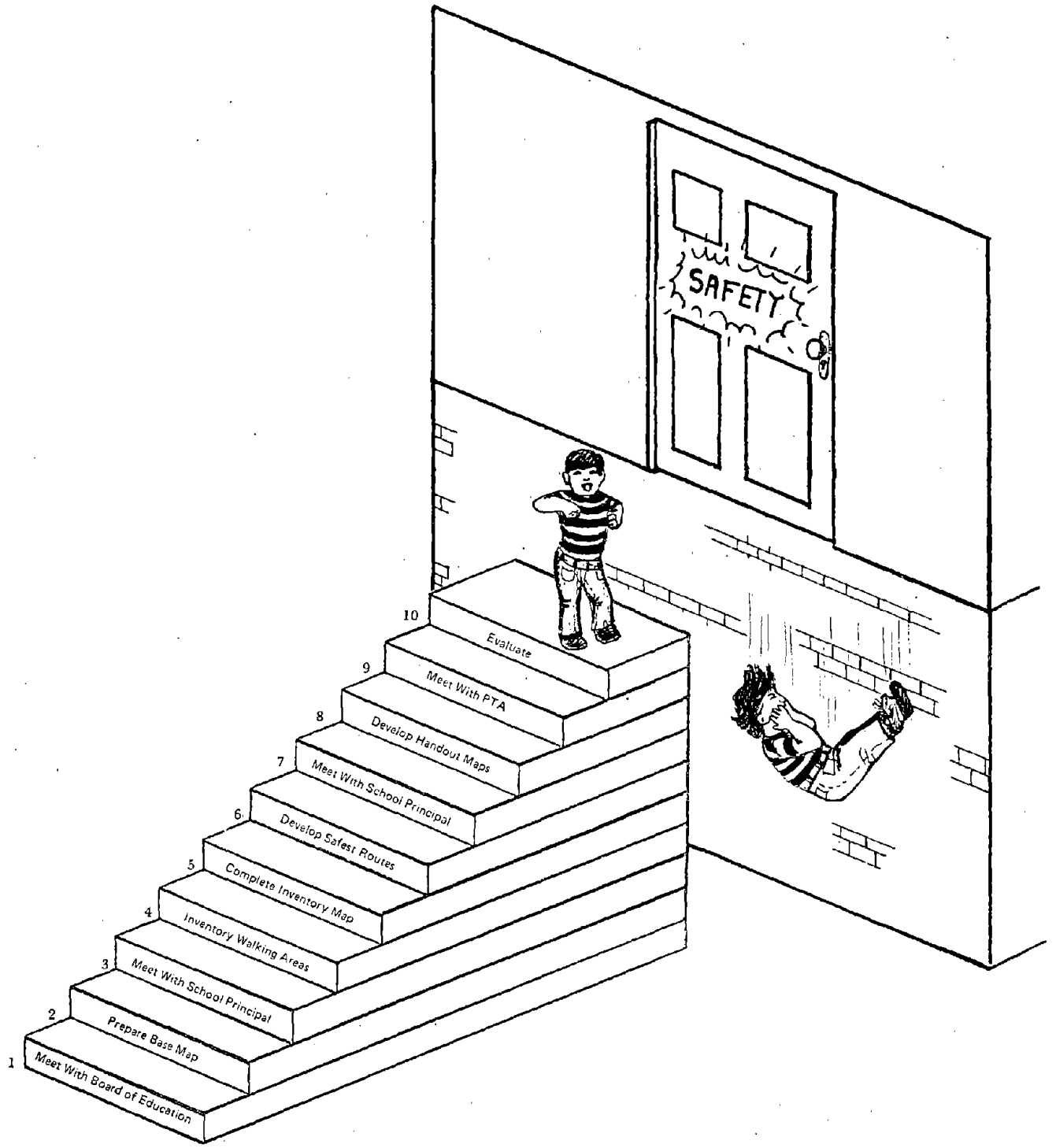


Figure 25. Incomplete Program

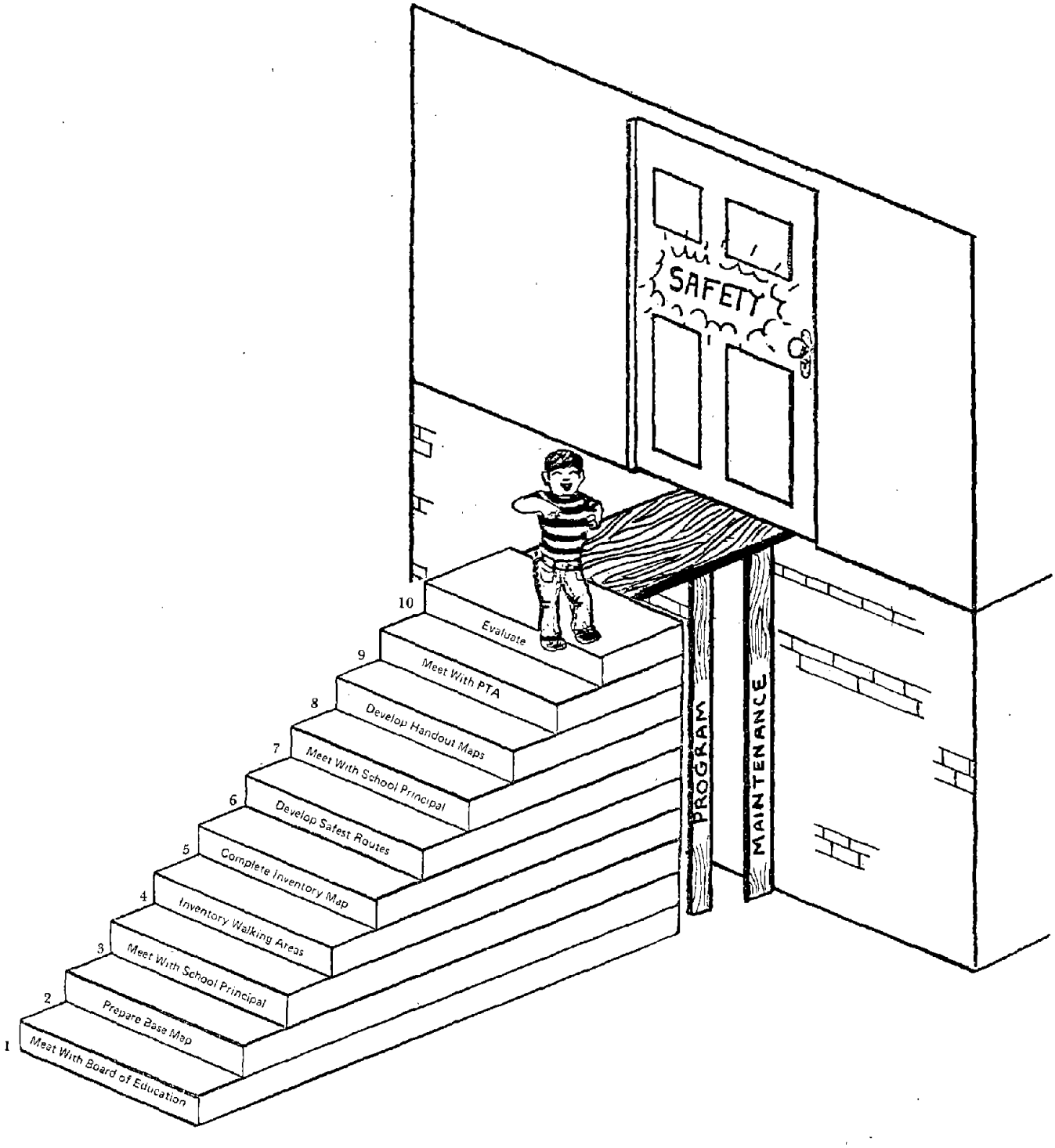


Figure 26. Complete Program

SUMMARY

The traffic engineer can play an important part in future school trip safety programs. They can't be developed overnight and they cost money in terms of staff and time, but the problem, as we have seen, is complex and is not *solely* a matter of slowing down the driver.

State and local safety programs encompassing safety treatments directed toward both drivers and students should be implemented. A means to effect change is through implementing a SAFE WALKING ROUTE TO SCHOOL PROGRAM. Typically, the program is characterized by the development of Safe Walking Trip Maps by the local traffic engineering authorities. The objectives of this program are:

- To get the community involved, i.e., the traffic engineer, the police, the school system, the local safety council and insurance companies, the media, the PTA, the parents, and, last but not least, the students, especially the five to nine year olds.

- To get everyone in the community to understand the information conveyed by the maps and the safety program.

- To improve everyone's understanding of traffic control devices, signs, and street markings.

- To communicate to each student and his or her parents the one suggested safest route to and from school.

The traffic engineering steps involved are:

- Making a traffic engineering analysis of the school areas based on the guidelines provided in the M.U.T.C.D., Part VII (1971), the ITE publication, "A Program for School Crossing Protection," the Traffic Engineering Handbook, Chapter 4 (1971), and a liberal sprinkling of engineering judgment. The City of San Diego (1971) has published a brief, concise document entitled "School Pedestrian Safety: Policies and Warrants." It would serve as an excellent resource document, describing within 27 pages the school traffic advisory committee, the responsibilities of the school, parents, police department, and city traffic engineers, and policies and warrants for traffic control devices and techniques.

- Making any changes determined necessary such as: removal of poorly situated crosswalks, possible creation of No Parking areas during school sessions (one of the reasons the community and the parents have to be involved and lend their cooperation and support), suggesting the placement of trained school crossing patrols at hazardous locations that must be used by the students, installing pedestrian-actuated traffic signals near the school when warranted, removing nonstandard signs and relocating standardized signs to standardized locations, removing flashing beacons where the road is level, wide, and clear (where the

driver can see that there is no potential hazard) so that he does not ignore the beacons when they are required (such as on the approach to a hill or curve preceding the school), making sure the beacons flash only when the students are going to and from school, devising a safe location for the parents to drop off students on rainy days, where the area warrants it, creation of one-way streets around the school, and the list goes on . . .

- After effecting safety modifications, drawing up handout maps for the safest routes and instructions for their use.
- Meeting with school principals and PTA's to discuss maps.
- Evaluating the safe walking route program to eliminate problem areas.
- Making your expertise available to the media, police and educators so they can develop materials aimed at the parents and the students. Working with the community (safety council, etc.) to develop a community sponsored program.

If the parents are not involved, the likelihood of success is reduced. The parents have to be encouraged to walk the routes with the children, explain the traffic control devices to the children, and think of the safety program when they drive through the route or approach another school area.

The school safety program should be maintained and periodically evaluated as part of a continuing effort.

The program cannot stop at the local level. To be successful, a widespread program with similar treatments, based on the same warrants using standard signs at standard locations, is required.

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