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SELECTING SAFEST ROUTES FOR ELEMENTARY SCHOOL CHILDREN

Techniques for Compiling Data Indicating Traffic Hazards and
Protection to Children Walking to and from School and
Mapping the Safest Routes to Travel, with Guiding
Principles for Selecting the Safest Routes



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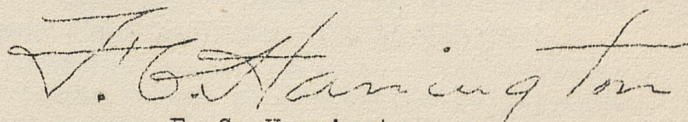
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8. Selecting Safest Routes for Elementary School Children

FOREWORD

This circular provides a suggested operating technique for selecting the safest routes of travel for children walking to and from elementary schools. It is hoped that the suggestions will serve as a guide to successful project operation.

The procedure presented herein is not mandatory. Local conditions and special requirements may necessitate some changes. It has been demonstrated, however, that this procedure is adequate to accomplish the desired objectives of such a project.

This procedure relates only to the technique of project operation. Nothing in this circular is to be construed as affecting or modifying in any way administrative procedures of the Works Progress Administration.


F. C. Harrington
Administrator

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PREFACE

Every year about 5,000 children are killed and 175,000 are injured on the streets and highways of the Nation. Without the daily vigilance of the police, teachers, and school safety patrols and the unceasing efforts of traffic authorities, parent-teacher associations, automobile clubs, safety councils, and others to cope with the situation, the toll undoubtedly would be much higher. Such maiming, suffering, and waste of youthful lives is without justification. Efforts to improve the situation must, and will be, continued by those who are vitally concerned with the problem.

The problem of safeguarding the lives of school children may be approached from several angles, all of which offer considerable hope of reducing accidents. One of the important approaches to the solution of the problem is the selection of the safest routes for children to travel in walking to and from school, based on careful analysis of pertinent information. The compilation and effective use of the necessary information requires expenditures of money in larger amounts than are ordinarily available from local sources, a fact which probably explains why this approach has not been more extensively employed.

Proper techniques of operation are also essential but have not been generally available heretofore. This circular offers a detailed procedure for the collection, compilation, and use of pertinent information in selecting the safest routes for children to travel in walking to and from school. Special attention is given to

criteria for selecting routes.

Though the WPA provides assistance by making workers available for projects, responsibility for the conduct of this project rests with the sponsor.

In releasing this circular it is assumed that the project will be supervised by a person who is technically qualified to develop any additional details which may be necessary in adapting the procedure to local conditions and special situations, to determine the specific duties each worker is best qualified to perform, and to analyze the information compiled. If this procedure is not applicable in a specific situation or is not acceptable to a sponsor, substitute forms, instructions for their use, and descriptions of methods should be submitted with the project application.

The material in this circular has been prepared by traffic specialists in the Division of Social Research of the Works Progress Administration. The procedure outlined is recommended by the Division of Women's and Professional Projects as a guide in the operation of this type of research, statistical, and survey project.

ENDORSEMENTS

"The plan appeals to us as an intelligent and practical approach to one aspect of the safety problem. We trust that school authorities throughout the nation will cooperate with traffic experts, WPA officials, and all local governmental officials in putting the suggestions of this bulletin into actual operation."

---Willard E. Givens, Executive Secretary,
National Education Association.

"The basic idea behind your outline for a study of this subject is certainly desirable from the point of view of reducing traffic hazards to school children. Commendation is warranted for preparation of sensible procedures which will permit the development of more sound routings for school children on their way to and from school.

"It is of the utmost importance that the project be properly planned and organized and that there be competent supervision of the project. It is also exceedingly important that there be a firm determination locally that the project shall be productive of results which will be utilized."

---Burton W. Marsh, Director
Safety and Traffic Engineering Department,
American Automobile Association.

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SELECTING SAFEST ROUTES
FOR ELEMENTARY SCHOOL CHILDREN

NATURE OF PROJECTA. Objective

The object of this project is to reduce the traffic accident toll among elementary school children by selecting, after careful analysis of pertinent information collected and compiled expressly for the purpose, the safest routes for children to travel in walking to and from school. As a result of the project each child will be provided with a small map showing him his safest route (Fig. 3, p. 37). A message on the back of the map, from the principal of the school to the parents, will explain the purpose of the project and how the routes were selected and will seek the cooperation of the parents. The selected routes are not mandatory, and the parents are of course free to direct or permit their children to take other routes.

Every school child should be provided with a safest route map. Even those who usually travel between home and school by passenger car, bus, or street car should be provided with such a map, for sometime during the school year they may find it necessary to walk.

It should be recognized that there are schools where satisfactory routes have already been established. It is not intended that this procedure shall interfere with or duplicate those efforts that have been based on adequate data and sound techniques.

For practical reasons this project establishes routes which

apply at all times of the day. However, this should not prevent the selection of different routes for use when children are going to school and when they are returning from school, provided the data and information clearly justify such selection. If such separate routes are desired it will be necessary to modify this procedure somewhat to give adequate consideration to vehicle volume and turning movements at crosswalks during the periods when children are going to school as contrasted with the time when they are returning from school.

Though this procedure is applicable primarily to built-up areas where school children go home at noon, there is no reason why it may not be used elsewhere, with some modifications.

B. Types of Data Obtained and Their Uses

The general types of data which are collected, compiled, and used in this project are as follows:

1. Street layout maps. -A street map showing the location of the school and the boundaries of the area it serves is prepared for each school. These maps are drawn to the largest possible scale consistent with convenience in handling. Where possible one map is made to include the entire area served by a school. These maps are used for spotting the residence location of pupils and for outlining the safest routes.

2. Pupil information. -The name, age, grade, and address of all pupils are transcribed on individual cards (Form SR-1, p. 40). The residence data provided by these cards serve to determine the

boundary of the area served by each school, if such boundary information is not readily available from the school authorities. The residence location of each pupil is spotted on the street map of the school district (Fig. 2, p. 35). Such a map is helpful in locating the most direct routes for the largest number of children, and as such serves usefully in the tentative selection of the safest routes.

3. Vehicle volume.-Vehicle volume counts (Form SR-3, p. 41) are made during the periods when children are going to and coming from school at all intersections where stop-and-go signals are in operation, where policemen are on duty, where school safety patrols are stationed, where pedestrian accidents have frequently occurred, and at all points where a relatively large number of children cross. Special emphasis is placed on the "cross-walk volume of traffic. This is the traffic which flows across a given crosswalk and includes the left and right turning traffic which turns into and crosses the crosswalk. The vehicle volume data are plotted or charted in an easily understood manner on intersection layout sheets (Form SR-5, p. 43). The data in such form serve as a useful guide in the final determination of the safest routes.

4. Type and location of safety measures.-An inventory is made of the type and location of safety measures at all intersections where vehicle volume counts are made. The data are plotted on the intersection layout sheets which also show the vehicle volume at crosswalks. The safest routes are selected so as to take advantage

of existing safety measures.

5. Pedestrian accidents.--Certain information relating to pedestrian accidents is transcribed from the best available sources. The information thus obtained is plotted on the intersection layout sheets, which also show the vehicle volume and safety measures. This information indicates the hazardous points which the routes should avoid, and suggests where it may be desirable for local authorities to take special action for improvement.

* * *

All of these types of data are given full consideration in the final determination of the safest routes of travel between home and school. Although directness is dominantly important, routes are selected with full consideration of existing protective devices, police and school safety patrol supervision, hazards as measured by accident experience, vehicular traffic movements at intersections, and concentration of school child pedestrians at certain points.

C. Supplementary Activities and Uses of Data

Though the main purpose of this project is to provide every school child with a map showing the safest route for him to take in walking to and from school, there are several other practical uses for the information developed by the project: police officials for determining where additional officer supervision is needed, especially at points where children cross in large numbers; school authorities and cooperating organizations for determining where to place school safety patrols; the traffic engineer for determining

where to paint crosswalks, install stop-and-go signals and caution signs, and where other measures should be taken in the interest of school child safety; school teachers for class discussions relating to pedestrian safety at specific locations in the school area.

To enhance further the value of this project it is suggested that the sponsor encourage and stimulate supplementary activities related to the project, such for example as the following:

1. Use by school teachers of the maps and data developed in the project. In some cases it may be possible and desirable for the teacher to develop projects or programs in which the pupils participate, demonstrating why the selected routes are the safest and giving the children a better understanding of the purpose of the routing plan.
2. Discussion of the project and the plans of the safest routes at parent-teacher association meetings and at meetings of other groups interested in school child safety, so that their cooperation and participation may be enlisted.

It is suggested that for hazardous locations the developed factual data, or copies thereof, be lent to interested school principals and city officials to provide a basis for a study of such locations, which may result in needed improvements.

The sponsor must assume full responsibility for the selection of the safest routes and for utilizing the finished products to maximum advantage.

D. Sponsors

Inasmuch as the effective use of the ultimate results of this project is largely dependent upon the cooperation and participation of the board of education, this project should be sponsored by that agency. However, since engineering knowledge is essential to the organization and successful prosecution of this type of project, the project should be cosponsored by an engineering department and technical guidance given by one of its representatives. Because the city traffic engineer is primarily concerned with safety on the streets and usually maintains records of data needed by the project, it is preferable that he be the cosponsor.

In the absence of a traffic engineering agency, the city planning engineer, the city engineer, or the police department will make a desirable cosponsor. In the event that the board of education is unable to assume sponsorship of the project, the cosponsors suggested above may sponsor the project. In any case, however, cooperation with the board of education is essential to the success of the project. In some communities it may be desirable for the sponsor to secure the active cooperation or participation of traffic safety representatives of the local automobile club or safety council.

E. Information Needed for Project Initiation

1. Personnel.--The sponsor should provide a technical supervisor who is to guide the work of the project, advise the WPA supervisor in matters relating to the operation of the project,

and participate in the interpretation of data and final selection of safest routes. It is preferable that an engineer be selected for this assignment. He should have administrative ability and practical experience in the application of traffic data to street safety problems. The supervisor furnished by the WPA should have administrative ability and some engineering or traffic survey experience.

Clerks, typists, and persons with drafting ability will be required. The clerks will make traffic volume counts, take inventory of safety measures, transcribe data from existing records, prepare lists, check field work against assignments, summarize data, and assist in the preparation of the individual route maps. The typists will cut stencils and prepare lists. The draftsmen will make maps and special stencils, spot accidents, plot safety measures, and chart the vehicle volume. Except for supervision, it should ordinarily be possible to utilize certified persons for all required services.

Based on the estimates for a typical school district including 500 pupils and approximately 40 intersections (not counting alleys), a rough guide for the man-days of project operation required for one school district is as follows:

| | |
|----------------------|---------------------------|
| Supervisor | (duration of the project) |
| Draftsmen | 28 man-days |
| Clerks | 205 " " |
| Typists | 14 " " |

The above figures, it must be emphasized, are estimates for a typical school district. They must be increased or decreased,

depending on the area of the district and the number of pupils enrolled at the school. The personnel requirements should be computed on the basis of a project operation not exceeding six months.

2. Materials and equipment.--The sponsor will ordinarily be responsible for providing the necessary materials and equipment. Quantities of forms, lead pencils, erasers, spring clamps and boards (for holding field sheets), mimeograph paper and ink, stencils, drawing paper, tracing cloth, and blue-print paper are required. Draftsmen will need the usual set of drawing tools, including T-squares, triangles, scales, India ink, drawing pencils, colored pencils, art gum, thumb tacks, etc. Further requirements are typewriters, drawing boards, a mimeograph machine, desks, tables, benches and chairs, together with facilities for storing and filing collected data and information, maps, etc. Working space also will have to be provided.

INSTRUCTIONS TO PROJECT SUPERVISORSA. Source of Data

Before starting work on this project investigate all sources to determine the availability of data needed in the project. Table I on page 11 lists the data needed and some of the more likely sources. All data which can readily be obtained from existing records should be used, and field work otherwise necessary should not be scheduled.

Determine whether a traffic flow map, not over five years old, is available. If such a map is available it should be used as an aid in determining where vehicle volume counts should be made. Determine where vehicle volume data are available and whether these provide data for the periods of time required by the project. Such data must not be over three years old to be properly representative of current traffic conditions. If apparently usable data are available for a large number of intersections, sampling checks should be run to make sure that the data are satisfactory. The data should not be used where significant changes in vehicle volume, street facilities, or traffic control have taken place since they were obtained.

Availability of traffic accident spot maps (especially of pedestrian accidents) and "worst corner" lists should also be determined. If available, these also should be used as aids in determining where vehicle volume counts should be made. Though comparatively recent accident spot maps and "worst corner" lists are

TABLE I. - SOURCES OF DATA

| <u>Data</u> | <u>Sources</u> |
|---|--|
| 1. Locations of elementary school buildings and entrances | Board of education or school superintendent |
| 2. Boundaries of school districts | School Superintendent or local school principals |
| 3. Street plan, roadway widths, and block numbers | Highway department, city engineer, traffic engineer, and street directory |
| 4. Locations and general dimensions of safety zones, channelizing and loading islands | Traffic engineer, highway department, and city engineer |
| 5. Street car and railroad tracks | Railway companies, city engineer, traffic engineer, and city map |
| 6. Volume of vehicular traffic | Traffic engineer, police department, city planning department, and city engineer |
| 7. Intersection police assignments | Police department |
| 8. Locations of school safety patrol assignments | Local school principal, automobile club, local safety council, police department, and traffic engineer |
| 9. Names, addresses, ages, and grades of elementary school pupils | Board of education, school superintendent or local school principal |
| 10. Locations, seriousness, etc., of pedestrian accidents at intersections | Traffic engineer, police Department, and coroner's office (also State motor vehicle department, if records are not available from local sources) |
| 11. Period of daylight during different days of the year | Weather bureau or local electric power company |

preferred, they are not essential for the purpose for which they are used here. However, recent (last two calendar years) accident records are to be used for obtaining and plotting information relating to pedestrian accidents, as provided elsewhere in this procedure. A general description of where vehicle volume counts should be made is given on page 22.

Suitable street layout maps of school districts^{1/} can be made from existing street maps. Inquire at all city departments for street maps which are drawn to a scale suitable for this project. If such maps are available the development of street maps for each school district would be a simple matter of tracing, involving no drawing layout work. If roadway maps are not available it will be necessary to obtain detailed information on street widths, block lengths, etc., from the highway department section maps or from plat books in that department, the city engineer's office, or the city assessor's office.

B. General Organization of the Work

A summary of the procedural steps for this project is given on page 17.

The work is to be so organized that the safest routes for one school district will be completed within a short time after the project is started. This school district should be relatively simple and without serious traffic hazards to provide opportunity for adequately training the personnel before the more difficult assignments are undertaken. Periodically thereafter other districts (in

^{1/} "School district" here, and elsewhere in this procedure, is defined as "the area served by one school."

the larger cities, several at the same time) should be completed and the finished products turned over to the proper authorities for immediate use. In general, safest route maps for the school districts which are confronted with the most serious traffic hazards are to be completed first. Hence, the greater part of the project personnel will be organized into several somewhat independent groups or crews, each developing, under the direction of the sponsor's supervisors, the safest routes for different school districts. However, such operations as transcribing pedestrian accident data, obtaining information for making maps, mimeographing, making lists, etc., can best be done by a special group working for the project as a whole.

The inventory of safety measures is to be made by the same workers who are to make vehicle volume counts. This plan utilizes the workers' time between counting periods.

C. Training Personnel

It is important that all field workers receive adequate training in the use of all field forms. Training is to consist of classroom instruction and practice sessions in the field.

The office workers must be given adequate instruction in the use and purpose of all field and transcribing forms. The instruction must indicate how to summarize the vehicle volume field forms and how to average the figures of the form sheets to obtain the average half-hourly flows. What accident records are to be transcribed must be made clear to all who are to do this work. Emphasis must be placed on the importance of the direction of travel

of the vehicle and pedestrian and on which crosswalk the pedestrian was crossing when the accident occurred. Transcribers must be able to classify accidents and assign the correct symbol number to each.

Draftsmen must be instructed in how to show data and information on Form SR-5 (p. 43) and on the safest routes and school population maps. Charting the vehicle volume and plotting pedestrian accidents must be fully explained. It is to be made clear that tentatively selected routes must always be made in pencil on the district map, and can be inked-in only after the routes have been inspected in the field and approved by the sponsor's supervisor.

D. Selecting the Safest Routes

Since the selection of the safest routes is the very essence of this project, it is of paramount importance that the most intelligent and responsible persons on the project be assigned to this work. One person after careful study may tentatively develop the safest routes for a particular school district, but the final selection should be the result of free and open discussions among at least three persons, including the sponsor's supervisor. It is desirable also to have the school principal participate in the final selection of routes. Such discussions should give full consideration to all the facts and to the guiding principles set forth on pages 29 - 34. All who participate in the discussions should be thoroughly familiar with these guiding principles.

After the routes are tentatively developed in the office,

a field inspection must be made and every route traveled over to observe first-hand what actual conditions confront the school children. Discussions and deliberations following the field inspection should determine the final selection of the safest routes.

E. What to Do with the Route Maps

The individual route maps for the pupils are to be assembled by grades and turned over to the school principals for distribution to the pupils. It should be suggested to the principal that for various reasons it may be desirable for the teacher to give individual explanations of the routes to certain children, especially the younger ones and those attending the school for the first time. For the higher grades the teacher may find it desirable to have pupil participation in the explanation of the routes and the general idea behind the activity. For this purpose a blueprint copy of the safest routes map of the district should be provided. The map may be used later for posting on the school bulletin board.

Copies of the safest routes maps should also be sent to the superintendent of schools, police chief, city engineer, traffic engineer, and others (especially the local automobile club and safety council). The disposition of route maps is a responsibility which clearly belongs to the sponsor, and no disposition is to be made without his approval.

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APPENDIX A

DETAILED INSTRUCTIONS
(for use of the survey staff)

Appendix A

DETAILED INSTRUCTIONSA. Summary of Procedural Steps

The detailed instructions for the operation of this project in each school district are divided into eleven steps of procedure as follows:

1. Transcribing the residence location of pupils
2. Preparing a map of the school district
3. Mapping the residence location of pupils
4. Transcribing information relating to pedestrian accidents
5. Determining where to make vehicle volume counts and take inventory of safety measures
6. Counting and mapping vehicle volume at crosswalks
7. Inventory and mapping of safety measures
8. Mapping pedestrian accidents
9. Selecting safest routes of travel
10. Mapping the safest routes of travel
11. Preparing a safest route map for each pupil

These steps are fully described in the succeeding pages. They are to be taken in the order indicated above. In most cases it will be necessary to complete step 1 to determine the boundaries of the area served by the school before step 2 can be undertaken. Step 3 can be undertaken only after 1 and 2 are completed; 1 and 4 can be undertaken at the same time. Step 5 can be started after 3

and 4 are completed. Steps 6 and 7 are to be undertaken and completed at the same time. Step 8 can be started after 6 and 7 are well under way. Steps 1 to 8 must be completed before 9, 10, and 11 can be undertaken.

Pedestrian accident data and information needed for making school district maps can and should be obtained for the entire city at the same time. However, it is advisable to concentrate efforts on one school district (in larger cities, several) at a time in order to benefit by experience and to maintain close supervision. The procedure described herein is written on the assumption that the project activities will be thus concentrated.

B. Transcribing the Residence Location of Pupils

Obtain the names, addresses, ages, and grades of all elementary school pupils. Transcribe these data on Residence of Pupil Form, SR-1 (p. 40), from the records on file in the principal's office.

After the transcribing work is completed, arrange and file the forms according to street and house number (In each street block keep the odd numbers and even numbers in separate groups). This arrangement will facilitate the "spotting" of residence locations, and, later, the preparation of a route map for each pupil.

C. Preparing a Map of the School District

The boundaries of the area from which children are enrolled at the school must be obtained from the school authorities, in most

cases the superintendent's office (for the whole city at once). If the boundaries are not definitely fixed but depend upon the enrollment and available school facilities, then it may be necessary to secure the information from school principals or by examining the file of pupil residence cards (Form SR-1, p. 40). The residence locations farthest away in each direction from the school fix the boundary points.

Prepare a pencil drawing of the street layout of the school district. The outlines of the streets are to be from curb to curb. Show the location of the school and the regularly-used entrances from the street, and such permanent structures as street car tracks, railroads, and safety islands. Use a scale which will make the map reasonably large, but not so large as to require more than one map to show the district. A scale of 100 feet to the inch is suggested, but may be larger or smaller, depending on the size of the district. Indicate by arrows the direction of one-way streets. Using a reliable street directory as a guide, indicate by small figures at the beginning of each block the number of the block and the side of the street with even numbers. In most cases numbering of the blocks on two boundary streets will suffice (Fig. 2, p. 35).

One tracing is to be made of the completed map. This will be used later for (1) spotting the residence location of pupils and (2) outlining the safest routes between the school and each residence block in the district.

D. Mapping the Residence Location of Pupils

Indicate on the tracing of the street map of the school district the residence location of each pupil. This is done by means of small dots. Each dot represents one pupil. Accordingly, there may be more than one dot for each residence location, and the completed map will have as many dots as there are pupils enrolled in the school. As each side of the street in each linear block is spotted, check the number of dots against the number of pupil residence forms (Form SR-1, p. 40) and enter the number lightly in pencil at the curb near the middle of the block (Fig. 2, p. 35). Ample space must be allowed between the dots and the curb outline, to permit the drawing-in of route lines after the safest routes are selected later in the project. Fig. 2 (p. 35) shows how the spotting is done.

E. Transcribing Information Relating to Pedestrian Accidents

Pedestrian Accident at Intersections Form, SR-2 (p. 40), is to be used for transcribing data from accident reports. Transcribe information for all accidents which meet all the following requirements:

1. Involved a vehicle striking a pedestrian
2. Resulted in death or injury to a pedestrian
3. Occurred at an intersection. For the purpose of this project an intersection accident is one which occurs within the intersection proper or on one of the streets, within 30 feet of the near curb line of the cross street.

4. Occurred during daylight hours. The hours of daylight vary with the seasons. As an aid to quick and accurate reference a chart or table should be made showing week by week the duration of the daylight period.

5. Occurred during the last two calendar years

Form SR-2 is self-explanatory, except for the last column which provides for classifying the accidents by type -- for use later in spotting the accidents. Entries for this column are not obtained from record sources; they are determined and made after the transcribing work is completed. The following four classifications, represented by symbols, are used in spotting the accidents on maps (Form SR-5, p. 43):

1. Child pedestrian death. If a child pedestrian was killed, the accident is to be given symbol No. 1, regardless of any other consequences of the accident.
2. Child pedestrian injury. If no child pedestrian was killed, but one or more were injured, the accident is to be given symbol No. 2, regardless of any other consequences of the accident.
3. Adult pedestrian death. If no child pedestrian was involved, but an adult pedestrian was killed, the accident is to be given symbol No. 3, regardless of any other consequences of the accident.
4. Adult pedestrian injury. If no child pedestrian was involved and no adult pedestrian was killed, but one

or more adult pedestrians were injured, the accident is to be given symbol No. 4, regardless of any other consequences of the accident.

These four classifications are mutually exclusive and consider death or injury to pedestrians only. A child here is defined as one within the age range of pupils attending elementary school -- usually 5-14 years.

Indicate in the heading of Form SR-2 (p. 40) the names of all streets at the intersection. Write the names in alphabetical order as, for example, "Pine and Sixteenth" and "Sixteenth, Thomas, and Walnut." After the forms for the entire district are completed, arrange them in strictly alphabetical order by location.

F. Determining Where to Make Vehicle Volume
and Take Inventory of Safety Measures

It is impossible to indicate here specifically where consideration is to be given to vehicle volume and safety measures. In general, a study of the pupil residence location map and the file of information on pedestrian accidents will prove helpful. Existing traffic flow and accident spot maps and "worst corner" lists should also be studied. A preliminary field inspection of the district will reveal the intersections which (1) carry heavy vehicular and pedestrian traffic, (2) involve heavy turning movements, (3) have safety measures installed, (4) are irregular or complicated, or (5) appear to be hazardous. All of these should be scheduled for field observation. Ordinarily, all of the intersections in the immediate

vicinity of the school will be selected for observation. The inter- sections of alleys and narrow ways with main streets need not be considered, except where hazards are known to exist.

G. Counting and Mapping Vehicle Volume at Crosswalks

Vehicle Volume Count at Crosswalks Tally and Summary Sheet, Form SR-3 (p. 41), is to be used by field workers at ordinary inter- sections of two streets. The movements to be counted are indicated by arrowheads and by the numbers 1 - 12. The letters A - D indicate approximate observation posts. The form is suitable for use at lightly-traveled intersections where one or two persons can record all movements and at heavily-traveled intersections where four or more persons are required. The following table shows posts to be taken and movements to be recorded, based on the number of persons assigned to an intersection:

| <u>Number of Persons Per Intersection</u> | <u>Observation Post</u> | <u>Movements to be Observed</u> | | | | | | | | | | | | |
|---|--|-------------------------------------|---|---|---|--|-----------|---------|-----------|--|-------|-------|-------|---------|
| 1 | A,B,C, or D | 1 - 12 | | | | | | | | | | | | |
| 2 | <table border="0" style="display: inline-table; vertical-align: middle;"> <tr> <td style="font-size: 3em; vertical-align: middle;">{</td> <td style="padding-left: 0.5em;">B</td> </tr> <tr> <td style="font-size: 3em; vertical-align: middle;">}</td> <td style="padding-left: 0.5em;">D</td> </tr> </table> | { | B | } | D | <table border="0" style="display: inline-table; vertical-align: middle;"> <tr> <td style="padding-right: 1em;">1 - 3 and</td> <td>10 - 12</td> </tr> <tr> <td style="padding-right: 1em;">4 - 6 and</td> <td>7 - 9</td> </tr> </table> | 1 - 3 and | 10 - 12 | 4 - 6 and | 7 - 9 | | | | |
| { | B | | | | | | | | | | | | | |
| } | D | | | | | | | | | | | | | |
| 1 - 3 and | 10 - 12 | | | | | | | | | | | | | |
| 4 - 6 and | 7 - 9 | | | | | | | | | | | | | |
| 4 | <table border="0" style="display: inline-table; vertical-align: middle;"> <tr> <td style="font-size: 3em; vertical-align: middle;">{</td> <td style="padding-left: 0.5em;">A</td> </tr> <tr> <td style="font-size: 3em; vertical-align: middle;">}</td> <td style="padding-left: 0.5em;">B</td> </tr> <tr> <td style="font-size: 3em; vertical-align: middle;">}</td> <td style="padding-left: 0.5em;">C</td> </tr> <tr> <td style="font-size: 3em; vertical-align: middle;">}</td> <td style="padding-left: 0.5em;">D</td> </tr> </table> | { | A | } | B | } | C | } | D | <table border="0" style="display: inline-table; vertical-align: middle;"> <tr> <td style="padding-right: 1em;">1 - 3</td> </tr> <tr> <td style="padding-right: 1em;">4 - 6</td> </tr> <tr> <td style="padding-right: 1em;">7 - 9</td> </tr> <tr> <td style="padding-right: 1em;">10 - 12</td> </tr> </table> | 1 - 3 | 4 - 6 | 7 - 9 | 10 - 12 |
| { | A | | | | | | | | | | | | | |
| } | B | | | | | | | | | | | | | |
| } | C | | | | | | | | | | | | | |
| } | D | | | | | | | | | | | | | |
| 1 - 3 | | | | | | | | | | | | | | |
| 4 - 6 | | | | | | | | | | | | | | |
| 7 - 9 | | | | | | | | | | | | | | |
| 10 - 12 | | | | | | | | | | | | | | |

Determine the time of starting and ending of the morning and afternoon school sessions. The traffic volume counts are to be made during the half-hour periods immediately preceding the beginning of the morning and afternoon sessions and the half-hour periods immediately following the closing of the morning and afternoon sessions.

involving four half-hour periods of counting per day. Each half-hourly count is to be recorded on a separate field sheet.

Count traffic at each intersection on one day only, preferably on Tuesday, Wednesday, or Thursday. No counts are to be made when and where the normal vehicular volume and movements are affected by extreme weather conditions, special events, street repairs, etc.

To eliminate misunderstanding of where to go and what to do, prepare individual assignment sheets. These may be worded somewhat as follows, but must contain all of the elements indicated:

"Mr. _____
 On _____, _____, 19____
 (day of week) (month and day)
 report at the _____ corner of
 _____ and _____. Take a
 position on the sidewalk approximately as indicated by
 the letter _____ on the attached Form SR-3. Promptly at
 _____ M. start recording the number of vehicles
 moving as indicated by the arrows numbered _____.
 Stop counting promptly at _____ M. Other periods of
 counting are _____ M. to _____ M.
 _____ M. to _____ M.
 _____ M. to _____ M."

To each assignment sheet attach as many field forms as there are periods of counting -- usually four, if one person makes all of the counts at the intersection.

Form SR-3 permits recording by the usual tally method (groups

of five short lines, the first four vertical and the fifth one diagonal across the four, for example: ~~llll~~ ~~llll~~ ~~llll~~ lll). Tallying spaces are provided back of the arrowheads which indicate each of the 12 usual movements of vehicles entering the intersection.

At the intersection the field observer will locate the point from which he is to observe traffic, and orient his tally sheet so that its indicated north and south direction corresponds with the north and south direction of the intersection. Entries can then be made conveniently in the proper spaces. Weather conditions (clear, cloudy, rain, snow, sleet, fog, etc.) prevailing during each period are to be recorded, as well as any other special conditions or incidents occurring which affect the normal flow of traffic. The north arrow and names of streets also are to be indicated.

After the field sheets are returned to the office and checked against the assignments, the tally marks in each space are to be summarized and the totals written down and circled with a red pencil. Combine the movements indicated and write the final totals in the small rectangles provided for the purpose in the four sections marked "Crosswalk Summary." The figures thus obtained show the volume of the important traffic movements which confront pedestrians at each crosswalk.

Using the four sheets for each intersection, add the corresponding figures and divide by four to obtain the average half-hourly flow for each movement of traffic during the time when children are going to and coming from school. (For example, if the right turn totals for traffic from the south during the four periods are: 90, 20,

30, and 40 vehicles, the final total would be 180 right-turning vehicles. The average half-hourly volume would be 180 divided by 4, or 45 vehicles.) Enter these averages for each intersection on a blank Form SR-3 and clearly mark the sheet "Average Half-Hourly Flow."

Using these forms which show average half-hourly flow, chart the flows to scale on the summary diagram, Form SR-5 (p. 43) in the manner shown in the example illustrated on the form. (It is to be noted that this same form is to be used also for recording accidents and safety measures.) A map scale of about 20 feet to the inch is suggested. A suitable vehicle volume scale can be selected by experimenting with intersections having small, medium, and heavy flows of traffic. The scale chosen must be used for all intersections in the district. All of the flow "bars" are to be of the same width, with the length varying in accordance with the average half-hour flow. They are to be placed directly in back of the crosswalks. The bar at each crosswalk is to be divided to show the volume of each of the three movements of vehicles that are of concern to the pedestrian. One division of the bar is to show the volume of vehicles crossing the crosswalk after making a right turn; another is to show the volume crossing the crosswalk after making a left turn; and the third division is to show the volume of all other vehicles crossing the crosswalk. The divisions are to be identified by cross-hatching as shown on the form. Note particularly the relative position of the divisions.

Each finished Form SR-5 must show the north arrow, names of streets, and other identifying features, such as a church, drug store, gas station, etc., at the corner.

The flow charts for the district are to be arranged alphabetically by main streets, with all of the charts for intersections on each main street grouped together in geographical order (Example: Walnut & 1st, Walnut & 2nd, Walnut & 3rd, etc.) and clearly indexed for quick reference.

H. Inventory and Mapping of Safety Measures

An inventory of traffic safety measures is to be taken at every intersection where a vehicle volume count is made. Only such traffic safety measures are to be recorded as meet both of the following requirements:

1. In effect at times when children are going to or coming from school.
2. Located at the intersection or on any of the intersecting streets, within 50 feet from the near curb line of the cross street.

Inventory of Safety Measures Form, SR-4 (p. 42), is to be used to obtain the required information, whether obtained from existing records or from field observation.

Assign a number to each policeman, school safety patrol boy, signal unit, sign, and pavement marking observed at the intersection and place these numbers on the sketch in a manner which will show their approximate location. As each safety measure is located

and numbered, enter its number on a line in the first column of the form. In the next column enter the letter which indicates the type of safety measure, as shown in the list of types on the form. In the third column record the main message if the device is a sign, the kind of pavement marking (permanent or temporary -- painted), and any other information which clearly describes the safety measure as it relates to school child safety. If a policeman is not on duty during each period when children are going to and coming from school, record here the periods during which he is not on duty. In the fourth column enter the measured distance of signs, signals, and markings from fixed points, so that they may be later located to scale on Form SR-5. The fixed point to be used in every case is the point where the nearest curb lines would intersect if extended. Paced distances are sufficiently accurate for the purpose. (With some practice observers can usually regulate their pace to three feet.) Also make a record of the corner from which the distance is measured. Use the fifth column to show the directions in which the signs and signals face. Complete the sketch by showing the north arrow, street names, and identifying landmarks such as a church, drug store, gas station, etc.

The information provided on Form SR-4 is to be plotted on the sheet (Form SR-5) which shows the vehicle volume and pedestrian accidents. From the entries on the field form establish the location of each safety measure and indicate each by a symbol as shown on Form SR-5.

I. Mapping Pedestrian Accidents

From the entries on the pedestrian accident cards (Form SR-2), establish the approximate location of each accident on Form SR-5. Indicate each by the symbol referred to in the last column of Form SR-2, and show the direction of travel of each pedestrian and vehicle participating in the accident, and the date and time of occurrence. The symbols to be used are shown at the top of Form SR-5. Form SR-5 is to be used also for plotting accidents occurring at intersections where volume counts and inventories of safety measures have not been made.

J. Selecting the Safest Routes of Travel

No formula for selecting the safest routes is offered here. The process of selection is analytical in nature, involving a careful study of all factors and the determination of the proper weight to be given each. Only the main guiding principles are included here. Consideration should be given first to the selection of main routes in each direction from the school to the district boundaries and passing as near as possible to the residence locations of the largest number of pupils. Primary attention must be given to factors which prevail when children are going to and from school. Each crosswalk at each intersection is to be studied separately. Comparisons are to be made with those at neighboring intersections which are likely to be considered in determining particular routes. The main guiding principles and a discussion of each are presented here:

1. Directness.--The first consideration logically should be directness. It is generally recognized that children will not take round-about routes. In practically every case there are several possible routes of equal distance between school and home. The problem is to select the one which appears to be the safest, considering all things. Sacrifice in directness is permissible only where safety advantages are outstanding.

2. Minimum use of roadway.--Select those routes which involve a minimum amount of pedestrian use of the roadways -- number and length of crossings. The distance from the curb to the nearest point of refuge must be considered in relation to all of the other factors present.

3. Complicated intersections.--Unless police officers are assigned to give special attention to school children, complicated intersections should be avoided. Where such intersections are signalized and considered in the routing, special attention must be given to the sequence of the signal colors. Often the signal operates in three separate periods, or certain movements (especially right turns) are permitted and controlled by special signal faces.

4. Converging routes.--Wherever possible select routes so that as many children as possible will converge at one place before crossing an especially hazardous street which must be crossed. By so doing better and more concentrated supervision is possible. Such concentration may permit a wider and generally more effective distribution of police and school safety patrol supervision in the district.

5. Police supervision.--Provided they are always on duty when children are going to and coming from school, police officers provide the best protection, since they have complete authority to control all movements of traffic.

6. School safety patrols.--School safety patrols should not attempt to control vehicle traffic. Their function is to instruct, direct, and control children in crossing streets at or near schools. Routes should be selected to take full advantage of such supervision as is already established. However, in some special cases it may be desirable to recommend the shifting of patrol assignments to fit in with selected safe routes. Consideration should be given to this possibility during the process of selection. However, it is imperative that the sponsor secure, in advance of the final selection of routes, the authorization and cooperation of those who are responsible for the school safety patrol activity.

7. Stop-and-go signals.--Signals afford an appreciable, though not complete, measure of protection to pedestrians. They should not be regarded as a guarantee of safety. Some signals, especially those with separate pedestrian intervals or "walk" lenses, offer greater protection to pedestrians than do other signals. Push button control gives the pedestrian additional convenience and enables him to choose a crossing time when turning vehicle interferences are likely to be few in number. Otherwise the pedestrian must cross the street under substantially the same conditions that would prevail if the signal had no such control. Caution must be exercised in selecting

routes which involve intersections that have special signal periods for certain movements and special regulations for certain turns.

Turning vehicles present the primary hazard at signalized intersections.

8. Vehicular volume at crosswalks.---The vehicular volume at crosswalks at all the intersections which are included in the most direct routes to school should be compared and analyzed before the safest routes are finally selected.

Other things being equal, preference should be given to those crosswalks which are crossed (1) by the least number of vehicles completing right turns, (2) by the least number of vehicles completing left turns, and (3) by the least total number of all vehicles. The right turns present the greater hazard to pedestrians, and usually are more numerous than the left turns. However, in many cases heavy left turn movements create even greater hazards.

It should be emphasized that the foregoing rules are intended only as a general guide. Other conditions prevailing at the intersections are to be given full consideration in determining crosswalks over which the children should be routed.

9. One-way streets.---Intersections of one-way streets afford relatively safer crosswalks than do intersections of two-way streets. Fig. 1 (p. 33) illustrates two typical situations. The small arrows indicate the safest crosswalks -- where there are no turning movements, and where no traffic crosses the pedestrian's path during certain periods, if the intersection is signalized. In some cases the volume of traffic on the one-way street may be so heavy as to create a hazard to pedestrians which may offset advantages

gain by the absence of turns. But this is not likely to prevail as a general rule.

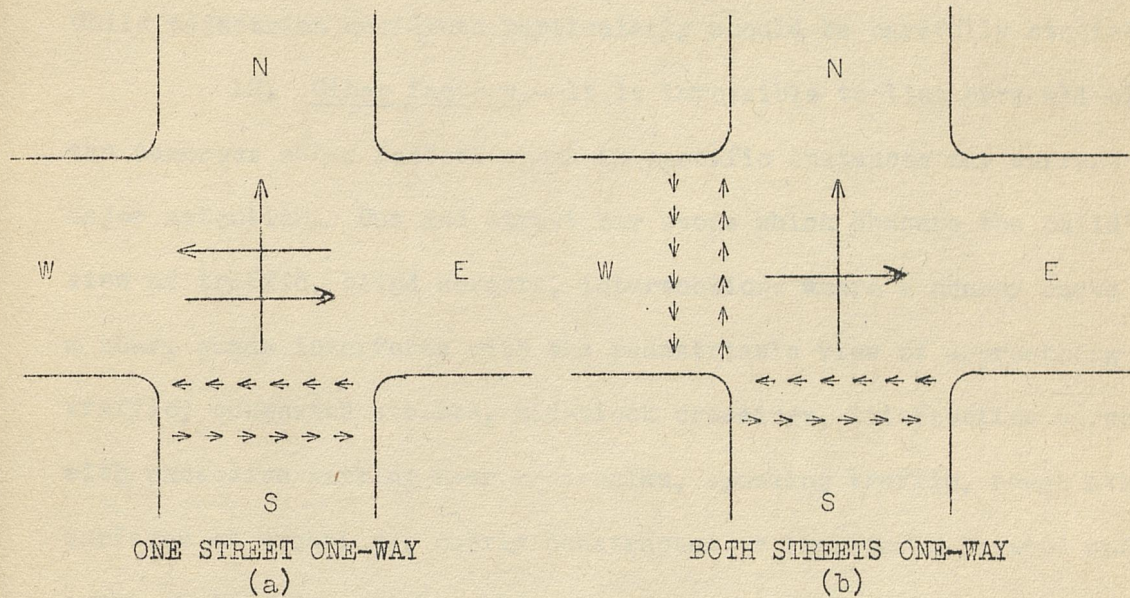


FIG. 1 SAFEST CROSSWALKS AT INTERSECTIONS OF ONE-WAY STREETS

10. Stop Signs.--While a stop sign does not afford as much protection as a traffic signal, vehicles must slow down and come to a stop, even if only momentarily. This obviously provides some measure of protection to pedestrians who cross the path of such vehicles. Advantage should be taken of this fact in selecting the routes. The signs or pavement markings directing the motorist to stop must be legible and in easily observed positions to be of maximum value to the pedestrian.

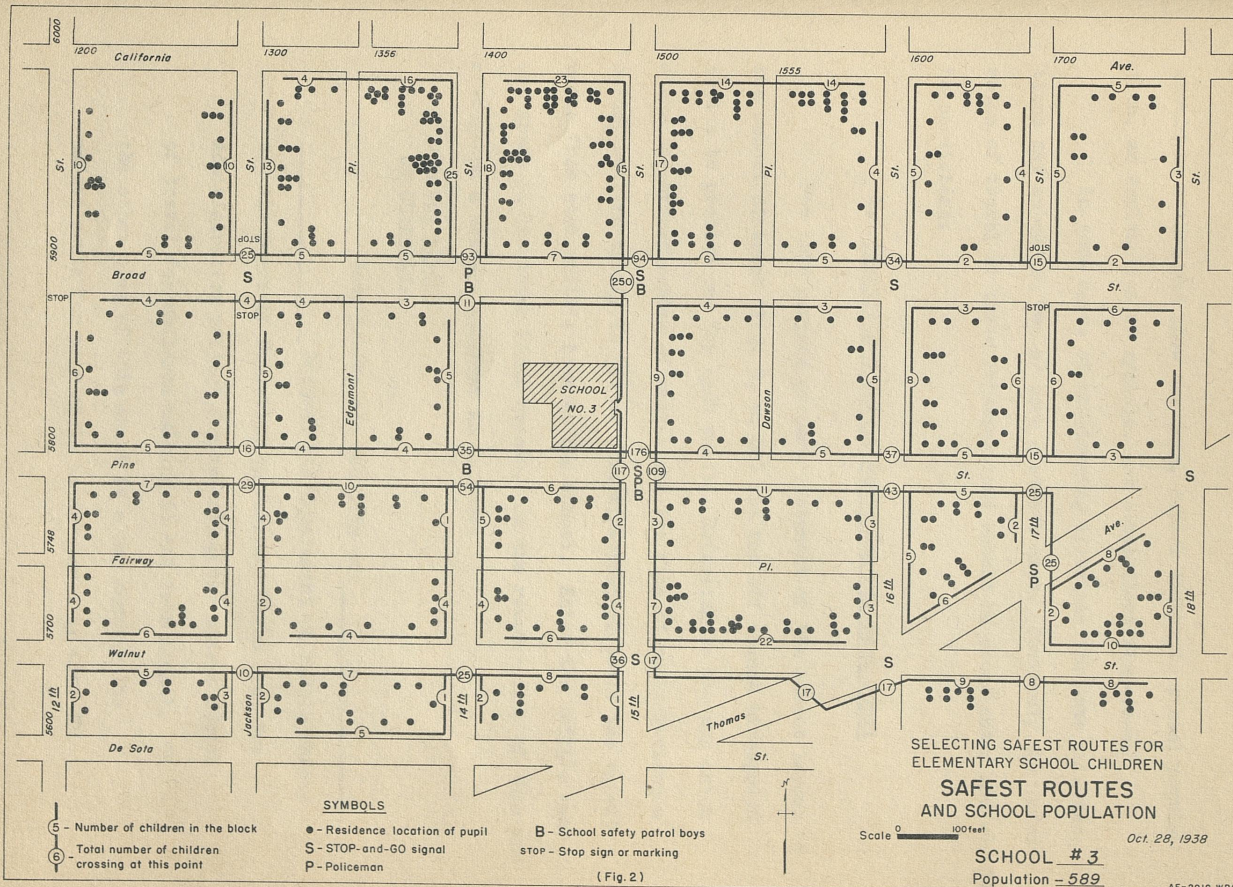
11. Pedestrian accident experience.--Consideration must be given to the number and types of pedestrian accidents that have occurred at intersections in the district. Insofar as possible, routes

should be selected so as to avoid those intersections or crosswalks at which pedestrians have frequently been involved in accidents. Child pedestrian accidents particularly should be carefully studied.

12. Other factors.---It is impossible to list here all of the numerous other factors which in specific instances may warrant major attention. Bus and street car stops which obscure the child's view of traffic, blind corners, intersections where a nearby curve or a sharp grade interferes with the pedestrian's view of approaching traffic, congested streets, mid-block crossings, intersection corners with excessive parking near crosswalks, speeding traffic, rough street surfaces at crossings, poorly constructed or improperly located safety zones or islands, and bad sidewalks in inclement weather, to mention a few of the more important ones, should generally be avoided in selecting the routes.

K. Mapping the Safest Routes of Travel

When the safest routes have been selected, show them on the same map which shows the residence location of pupils. Figure 2 (p. 35) illustrates how this is to be done. At each crosswalk where children cross a street place a number in a circle to indicate how many children use the crosswalk. Place a number in a half circle near the middle of a block to indicate how many children in that block are to be provided with route maps. Bold symbols are used on this map to show what general types of safety measures are at the intersections. The map



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should be titled and show the date, school district, school population, an explanation of symbols, and other identifications.

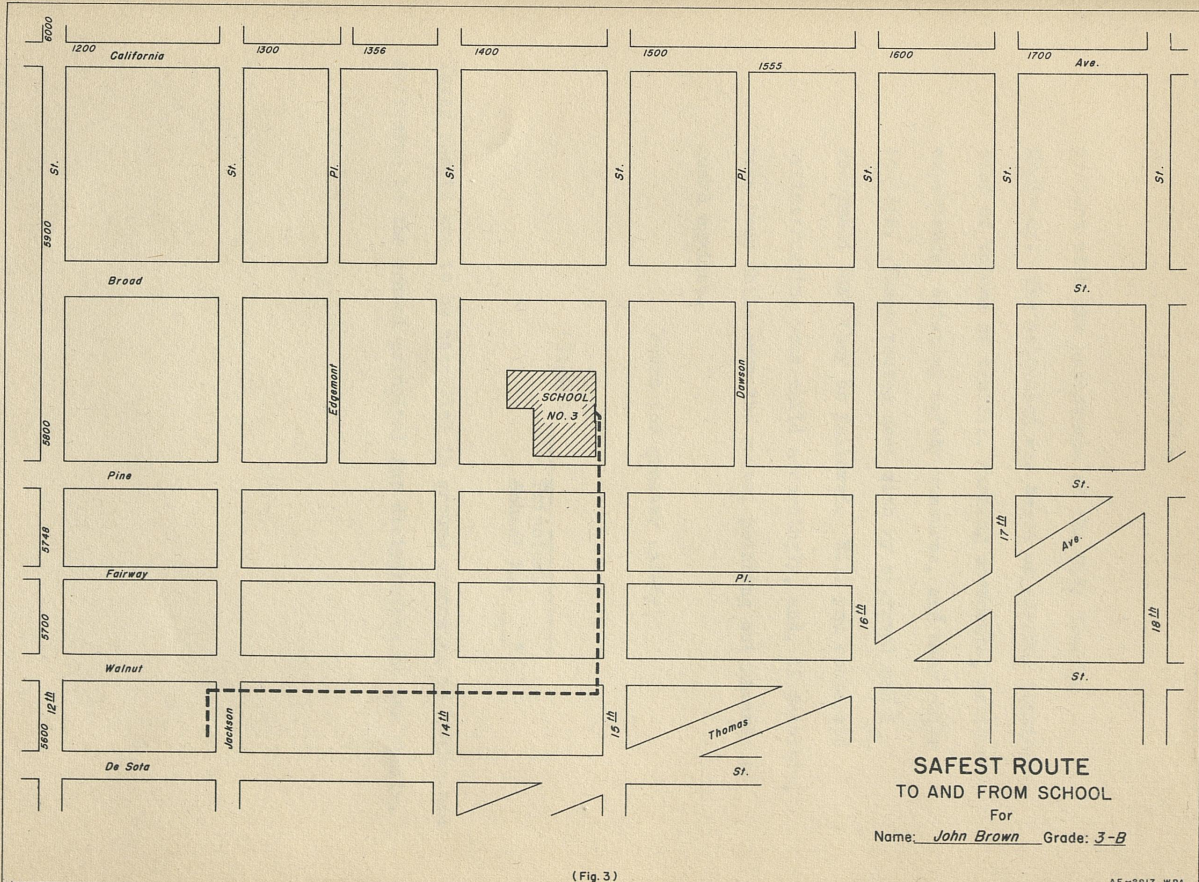
In some cases of overlapping districts the same intersections may appear on two or more district maps. Obviously the safest paths of travel at these intersections should be coordinated and should be consistent.

L. Preparing a Safest Route Map for Each Pupil

For this purpose prepare a stencil of the street layout of the school district (Fig. 3, p. 37) and run off enough mimeograph copies to provide one for each pupil. Referring to the map which shows the safest routes of travel and the file of pupil residence cards, outline boldly in red on this mimeographed sheet the safest route from each child's home to the school. Enter the child's name and grade in the lower right corner. On the reverse side of this map mimeograph a message somewhat as follows:

"TO THE PARENT
OR GUARDIAN:

Some months ago the City of _____
_____ through its Department of Public Safety
and the Board of Education sponsored a Works Progress
Administration project for selecting the safest routes
of travel for children walking to and from school. On
the other side of this sheet is a map showing the
safest route for your child as developed by this WPA



SAFEST ROUTE
 TO AND FROM SCHOOL
 For
 Name: John Brown Grade: 3-B

(Fig. 3)

project with the assistance of the City Traffic Engineer. The selection was based on careful consideration of volume of traffic, turning movements, accident experience, existing safety measures, and many other factors. These routes meet with my approval and I recommend that they be followed. Will you cooperate by instructing your child accordingly, and, if possible, take your child over the route, pointing out hazards to guard against.

Yours for greater safety,

(Signed) _____
Principal
School No. ____"

These sheets are to be assembled in groups according to grades and delivered to the school principal for distribution to the pupils.

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APPENDIX B

FACSIMILES OF FORMS

SELECTING SAFEST ROUTES FOR
ELEMENTARY SCHOOL CHILDREN

RESIDENCE OF PUPIL

School # 3

Name of pupil John Brown

Street and house number 5622 Jackson St.

Age 9 Sex: Male Female Grade 3-B

Recorded by S. A. R.

Date 9/19/38

SELECTING SAFEST ROUTES FOR
ELEMENTARY SCHOOL CHILDREN

PEDESTRIAN ACCIDENTS AT INTERSECTIONS

Intersection Broad and 15th School # 3

Transcribed by R. S. Date 9/19/38 Source Police

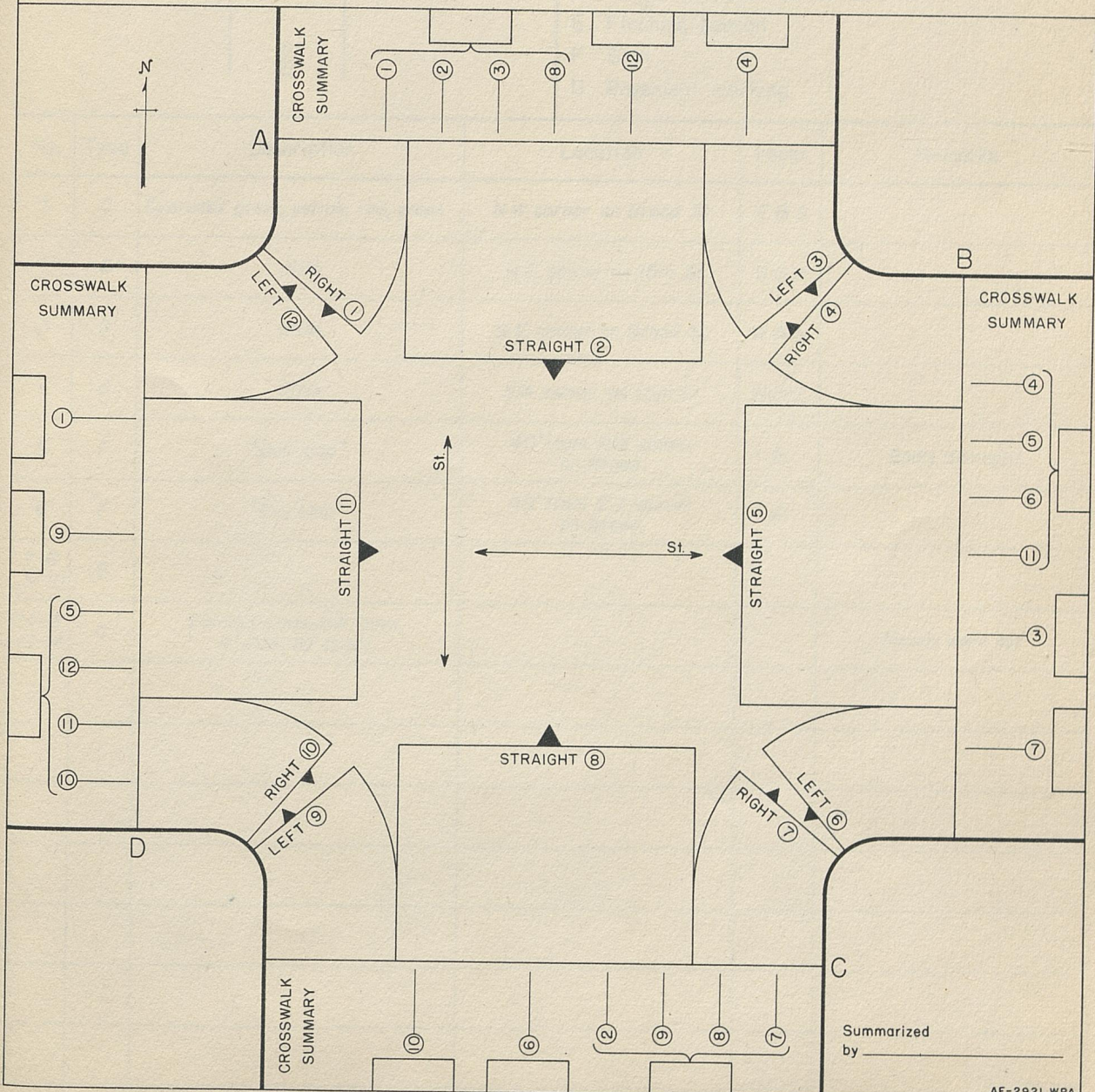
| File Number | Date | Time of Day | Pedestrian Moving | | | Vehicle Moving | | | | Ages of Pedestrians | | Accident Symbol Number |
|-------------|----------|-------------|-------------------|-----------|--------------|----------------|------|----|-------|---------------------|--------|------------------------|
| | | | From | To | Across | From | On | To | On | Injured | Killed | |
| 341 | 5/3/37 | 10 A.M. | N.W. Cor. | S.E. Cor. | Both Streets | N. | 15th | S. | 15th | 23 | | 4 |
| 412 | 8/12/37 | 11:30 A.M. | S.E. Cor. | N.E. Cor. | Broad St. | S. | 15th | E. | Broad | 8 | 38 | 2 |
| 790 | 12/3/37 | 2:15 P.M. | N.E. Cor. | S.E. Cor. | Broad St. | N. | 15th | E. | Broad | 9 | 7,21 | 1 |
| 834 | 12/14/37 | 3 P.M. | S.W. Cor. | S.E. Cor. | 15th St. | N. | 15th | S. | 15th | | 27 | 3 |
| 839 | 12/18/37 | 8:45 A.M. | S.E. Cor. | N.E. Cor. | Broad St. | S. | 15th | E. | Broad | 7 | | 2 |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
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SELECTING SAFEST ROUTES FOR ELEMENTARY SCHOOL CHILDREN VEHICLE VOLUME COUNT AT CROSSWALKS TALLY AND SUMMARY SHEET

Date _____ Day of Week _____ School _____

Weather _____ Intersection _____

Observed by _____ This sheet covers period from _____ A. M. to _____ A. M.
P. M. to _____ P. M.

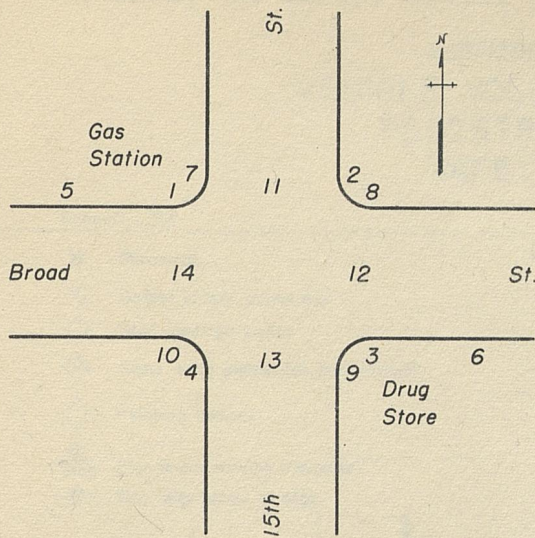


SELECTING SAFEST ROUTES FOR
ELEMENTARY SCHOOL CHILDREN
INVENTORY OF SAFETY MEASURES

School No. 3

Intersection Broad & 15th

Recorded by T. A. D. Date 9/21/38



TYPES

- A. Policeman
- B. School safety patrolman
- C. Electric stop-and-go signal
- D. Same-with push button control
- E. Flashing beacon
- F. Sign
- G. Pavement marking

| No. | Type | Description | Location | Faces | Remarks |
|----------------|------|---|-------------------------------|-------|-----------------|
| 1 | C | Operates green, yellow, red, green | N.W. corner on Broad St. | E & S | |
| 2 | C | ditto | N.E. corner on 15th St. | S & W | |
| 3 | C | ditto | S.E. corner on Broad St. | W & N | |
| 4 | C | ditto | S.W. corner on 15th St. | N & E | |
| 5 | F | "Bus stop" | 40' from N.W. corner on Broad | E | Badly damaged |
| 6 | F | "Bus stop" | 40' from S.E. corner on Broad | W | |
| 7-8 9-10 | B | | | | |
| 11-12 13-14 | G | Painted crosswalk lines, 4" wide, 10' apart | | | Nearly worn out |
| | | | | | |
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SELECTING SAFEST ROUTES FOR ELEMENTARY SCHOOL CHILDREN

SUMMARY DIAGRAM OF
VEHICLE VOLUME AT CROSSWALKS
PEDESTRIAN ACCIDENTS
SAFETY MEASURES

School: #3

Intersection: Broad and 15th

SYMBOLS

- * Policeman
- + School safety patrol boy
- ⊠ Stop-and-go signal
- ⊠ Same (with pedestrian push button)
- ⊠ Flashing beacon
- ⊠ Sign (main wording indicated)
- One-way arrow or sign

1. ⊕ Child killed
 2. ⊙ Child injured
 3. ⊕ Adult killed
 4. ⊙ Adult injured
- Path of pedestrian
→ Path of vehicle
--- Street marking

- Vehicles crossing crosswalk after making RIGHT turn.
- Vehicles crossing crosswalk after making LEFT turn.
- All other vehicles crossing crosswalk

Scale: 1" = 200 vehicles.

