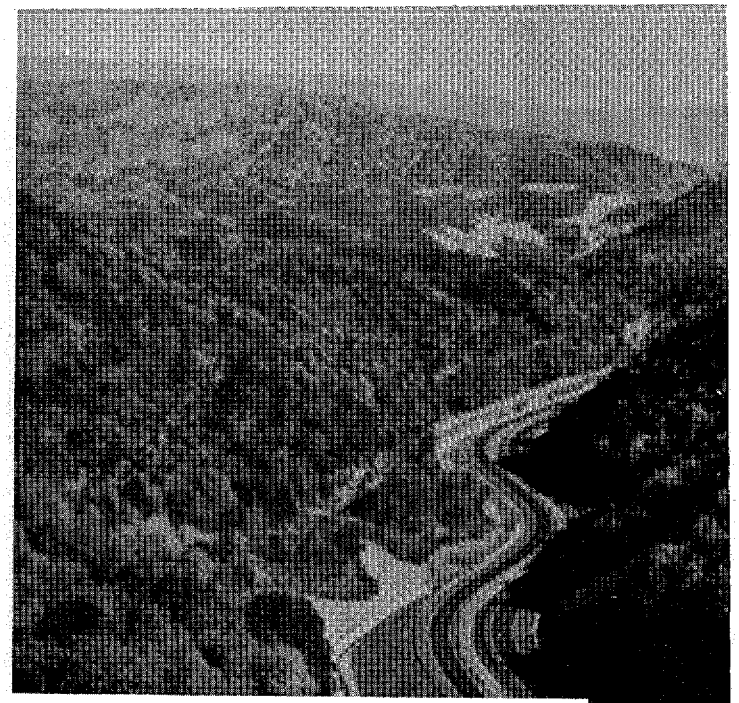
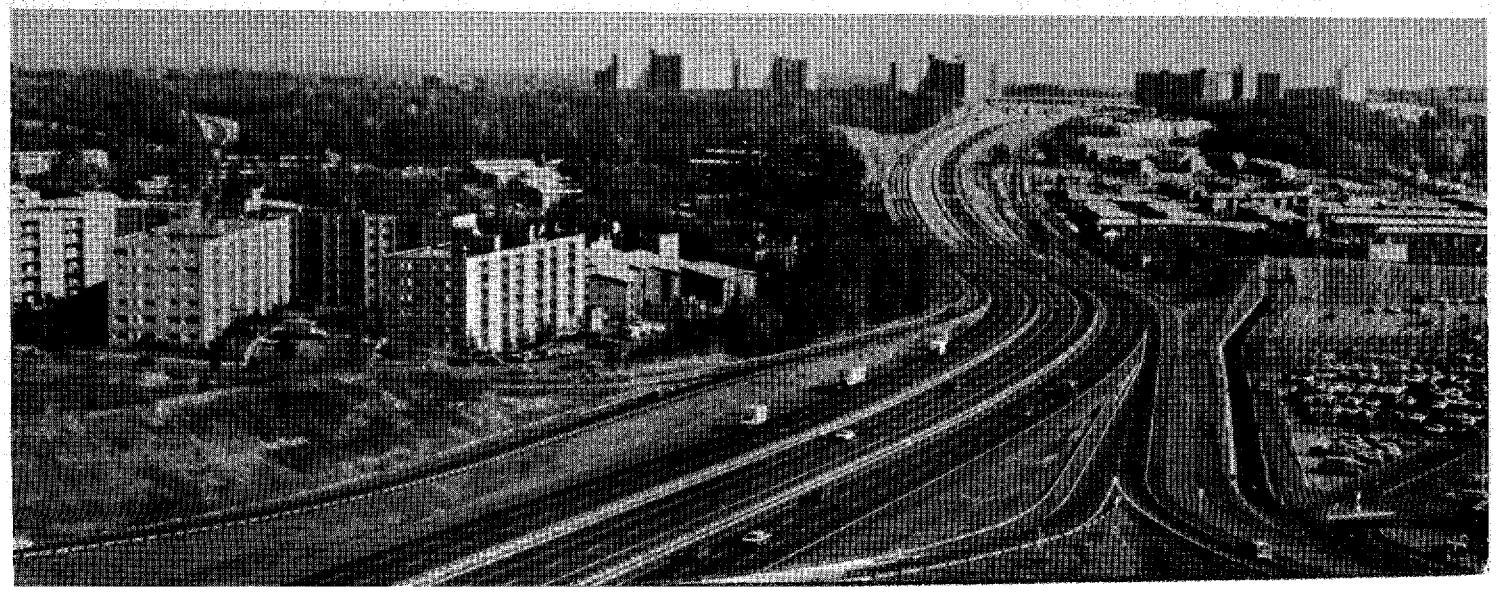
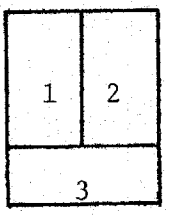


Guide for a ROAD INVENTORY MANUAL OF INSTRUCTIONS

U.S. DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION





Cover Photographs:

1. State Route 14, Chamberlain Lake, Washington State
2. Interstate 64, near Callaghan, Virginia
3. Interstate 95, Shirley Highway, Alexandria, Virginia

Guide for a
ROAD INVENTORY
MANUAL OF INSTRUCTIONS

NOVEMBER 1974

U.S. DEPARTMENT OF TRANSPORTATION

FEDERAL HIGHWAY ADMINISTRATION

FORWARD

This "Guide" has been issued to assist the States in preparing their respective inventory manuals. It supersedes the April 1967, edition.

Conditions encountered in some States may require certain departures from these instructions. However, road classifications by surface type and other such data to be reported in national summaries should remain unchanged from the categories as described.

TABLE OF CONTENTS

APPENDICES

Guide for a Road Inventory Manual of Instructions

Section I. Purpose of a manual

The road inventory manual provides instructions in the general methods of road inventories to be conducted by the various State highway agencies in cooperation with the Federal Highway Administration. It is not intended to answer all questions that may arise in the conduct of the work, but is meant to enable employees to understand more clearly the requirements and purposes of the various inventories. The State's manual should be issued to each employee involved in the road inventory operations. Supplements covering special duties or additional work should be issued as the State sees the need.

Section II. Purpose of an inventory

An inventory is made to obtain data for compiling statistics on the mileage and characteristics of the several types of roads, streets, structures, and other pertinent items within a geographic area. There are some characteristics which can be obtained only by field examination and others which can be obtained or estimated from administrative records, aerial photos, etc. These latter sources may require periodic field checks to update and verify their accuracy. The road inventory constitutes one of several phases of the highway planning process which is a function of the State highway agencies.

Among the uses of the data collected will be the development and updating of maps and computerized information systems. The maps can be used to show public roads outside of, and principal street connections through cities, incorporated towns, and villages; and to locate important structures and other off-the-road cultural features such as farm buildings, dwellings, schools, churches, and other important landmarks. Computerized information systems can lead to combined data bases which lend themselves to more efficient and comprehensive utilization by all divisions of the State highway agencies and possibly other State agencies too.

Section III. Organization and equipment

The road inventory organization and staff may vary considerably from one State to another. This is because of the many differences in geology, topography, meteorology, population, program goals, etc. among the States. Each State should, therefore, maintain its own inventory organization so as to meet not only its own internal needs, including those of local governments, but also the known requirements for national summaries as prescribed by the Federal Highway Administration or other governmental agencies.

Equipment furnished to the inventory organization should consist of such surveying and drafting tools and supplies as are determined to be necessary to meet the goals and standards of the inventory. Safety equipment must receive high priority for the inventory crew. Field parties should use safety devices complying with, and prescribed by, State law and/or administrative policy.

Section IV. Kinds of inventories included in a road inventory

As with many organizations, an inventory of existing conditions and services, along with a history of the conditions and services as provided by the transportation system, is the basis for determining forecasts of the various demands of the existing and future transportation systems. Therefore, the inventory organization should be sufficiently versatile so that it can provide accurate, comprehensive data for a multitude of periodic and special inventories related to the State's transportation system. Among the kinds of inventories that may be required are the following:

1. Rural and urban road inventory
2. Traveled-way studies
3. Highway defense bridges inventory
4. Railroad crossing hazard rating
5. Traffic control devices inventory
6. Rest area inventory
7. Land use inventory
8. Terminal and transfer facilities inventory
9. Junkyard inventory
10. Billboard inventory
11. Transit inventory
12. Bikeway inventory

In addition, there are several other inventories that are becoming more important and which should become a part of the planning process. These include measurements of sound densities, air quality levels, and other environmental effects of the transportation system. Further, more specific, information related to these and other inventories may be found by consulting the appropriate references at the end of this guide.

Section V. Procedures for data collection

During the early years of the planning surveys, the data collection procedures were such that a complete reinventory, which in effect amounted to a new inventory, was made during an established cycle. Consequently, little use was made of the data gathered during previous cycles when conducting subsequent inventories. In recent years though, these collection procedures have been updated and revised, more dramatically by taking advantage of the inherent data handling capabilities of computers and related hardware. Through application of coordinated data systems concepts, several State transportation agencies have established more efficient data gathering techniques. The result has been a reduction in field data collection efforts, a more current and comprehensive inventory data base, and a more effective road inventory activity.

All sources of information should be examined and utilized to the maximum extent practicable. This should include such sources as official city maps, construction records, aerial photographs, railroad evaluation maps, public lands maps, maps prepared by other governmental agencies, maintenance crew reports, and any others readily available. (Much of the topographical and geodetic information may be obtained from the National Cartographic Information Center.) These sources should be used routinely to update the inventory records on a continual basis. Efforts should be made to establish reporting procedures from these sources, where such procedures do not presently exist, to maintain current data on a routine basis. The data obtained from these sources should be confirmed periodically. This should be done by intermittent field inspection or aerial photography, depending upon changes in local economic development and population growth, to assure that the inventory data base is reasonably current, accurate, and complete.

There are several means presently available for the collection of required data. One alternative could be to have no field crew at all, but simply to rely upon a reporting system to maintain the records. This may be the most efficient method, however, data files may be less accurate and less current than with other methods. Perhaps the other end of the data collection alternatives list would be to rely upon field crews only. This method is expensive and time consuming, but the data should be fairly accurate and complete. Other alternatives include such methods as aerial photography, orthophoto map interpretation, photologging, etc. In reality it will more than likely be more advantageous for each State to devise a combination of these procedures which will be particularly suited to the individual State. It has become increasingly important, particularly from a coordinated data systems viewpoint, to be able to locate or reference data for easy access. Therefore, in establishing data collection procedures, reference should be made to the publication "Highway Location Reference Methods."

Section VI. Inventory procedure

A. Road description

The highway system classification, surface type, width (to nearest foot), condition, etc., for each road inventoried should be recorded on the appropriate form. One column should be used for each section of road, with all descriptive items that apply checked or noted. A new section should be made where a change in road characteristics occurs; where county or zone lines, corporate limits of cities, villages, reservation boundaries, etc., are crossed. All sections should contain complete information.

Where the State has not expressed a different preference for a numbering system of roads, the roads not previously numbered should be given a series in each State. The preferred system is that EVEN numbers are assigned to roads having a general east-west direction, starting the series at the north border of the State, and ODD numbers are assigned to roads running generally in a north-south direction, starting at the west border of the State.

For unsurfaced roads and roads having improved surfaces of indefinite width, the prevailing width of the traveled-way or improved surface, as well as road width, should be noted. Sections between which the road is restricted on either or both sides by any barrier such as a large drainage ditch, canal, retaining wall, railroad track, etc. should also be noted. The notes should at least include station-to-station limits of the restriction and the distance from the road shoulder to the restriction. Photographs should be taken of especially hazardous road conditions or at structures, railroad crossings, or intersections where uncommon situations are found.

B. Sidewalks

Where a sidwalk or bicycle path of 500-foot length or more exists (outside corporate limits of cities, towns, boroughs, villages, or delimited areas), its beginning, end, location on right or left, and kind should be noted.

C. Closed or abandoned roads

When a road is closed by a fence or any other obstruction which appears to be for the purpose of closing the road permanently, the inventory should stop at the barrier and the facts should be recorded in the notes. In such cases, a note should also be made to show whether or not the road beyond the fence or obstruction appears to have been used recently. It should also be noted

on the field form if the road is bordered by fences, or shows other evidence of having been a public road at one time. This does not apply to roads open to the public which have gates across them to retain livestock.

D. Impassable roads

For those roads made impassable by seasonal climatic conditions, consideration should be given to scheduling field operations at the most favorable time in the interest of safety and efficiency. When, despite best scheduling efforts, it is necessary to inventory temporarily impassable sections of roads, measurement may be made by a tape or by pacing.

E. Determination of road status

The field party should obtain all field data necessary to determine whether or not a road is legally a public road, but the actual determination will be made by staff personnel only after legal and administrative responsibilities have been established. However, where a road is not shown as a public road on the map, local inquiry should be made for facts to aid in determining its public or private status. The notes should show the information used as a basis for the inventory of such a road.

F. Toll roads

If a road is a toll road, record in the inventory notes the name of the road, if any, and whether it is operated as a public or private facility. Identify it as a toll facility and inventory it as any other road would be inventoried.

G. Questionable Roads

Where roads appear to be public but are not shown on the maps furnished to the field party, their locations should be shown on a map by reference to aerial photos or should be determined by compass for general direction of each section. Bearings should be taken sufficiently often so that the general course may be approximated and complete notes taken in relation to other rural roads which are shown on the map. Occasional tie-in to fixed objects should be made where possible. The status of such roads (public or private) will be determined in the office at a later time--before they are included as public roads. Where the course of a road is found to be substantially different from that appearing on the map, other corrections should be made on the large scale map. With maps updated from aerial photos, field party work of this nature should be minimal.

H. Drainage

Culverts and minor structures with a clear opening from 3 feet up to and including 20 feet may be inventoried. If these culverts and minor structures are inventoried, information on the station, direction of flow, materials, type, and sizes should be obtained. Also, show roadway width when it is less than the normal width of the road. For culverts, record whether pipe, box, arch, or other.

I. Roadway structures

Structures to be inventoried are all bridges, both free and toll, that meet the AASHTO definition of a bridge as given in AASHTO Highway Definitions, adopted in June 1968. This publication defines a bridge as follows:

> A bridge is a structure including supports erected over a depression or an obstruction, as water, highway, or railway, and having a track or passageway for carrying traffic or other moving loads and having a length measured along the center of roadway of more than 20 feet between undercopings of abutments or spring lines of arches or extreme ends of opening for multiple boxes or pipes where the clear distance between openings is less than half of the smaller contiguous opening.

All other structures crossing over or under the highway which serve public or private properties will also be inventoried. Bridges which have limitations in certain characteristics from a defense highway viewpoint should also be inventoried. Refer to Volume 4, Chapter 7, Section 2 of the Federal-Aid Highway Program Manual for further information. The inventory of these structures is described under Section VII, Structures carrying the road and ferries, and under Section VIII, Structures over the road. (Refer also to the Bridge Recording and Coding Guide.)

J. Off-highway culture

Structures and other items off the road that may be inventoried include: farm units, dwellings, schools, churches, public meeting houses, public cemeteries, hotels, resorts, tourist camps, stores, mills, factories, canneries, mines, ball parks, fairgrounds, public and private golf grounds, country clubs, railroad stations, junkyards (classified as either 1. refuse, garbage or trash dumps, 2. automobile graveyards, 3. scrap metal, 4. scrap building material, 5. sanitary fills, or 6. other), and other culture outside of cities, incorporated towns, and villages and urban

compacts served by the road being inventoried (not inventoried on another road). To avoid duplication where a feature is located at a road intersection, the feature should be inventoried on the road from which the principal entrance leads. If entrance is from both roads, the one of major importance should govern. Where this distinction cannot be made, the item should be inventoried from the road judged more important.

K. Unincorporated places

In the case of unincorporated communities, the principal routes through the village and all side roads and streets should be logged with respect to length, width, type, and condition of surface, and inventory taken of the cultural features on each road or street where such is desired by the State. The number of dwellings, stores, etc., in each block should be shown separately on each side of road if blocks are defined; if blocks are not defined, this information should be reported for each tenth of a mile; dwellings, stores, etc., should be shown separately. Inventory of bridges of greater than 20 feet clear span and of all railroad crossings should be included on the side roads and streets as well as on the through routes. Regardless of whether side streets exist, all hamlets and crossroad settlements, however small, should be recorded in the notes by local name and odometer reading. Where necessary to clarify the record in densely settled sections, a sketch should accompany the field notes.

L. Private roads

Local roads and streets in suburban subdivisions, unincorporated company-owned mill towns, etc., should be logged as described above, provided they show evidence of being legally opened to unrestricted public use. Where it is known that maintenance is actually performed by private property owners, this should be indicated.

Where it is not practicable to arrange an advance investigation, the roads should be logged. Final adjustment can be made later when the work is reviewed and private roads, which in the field work were considered open to public use, can then be placed in their proper category.

M. Delimiting compact areas

In many States, all of the urban communities are not incorporated or the corporation includes the entire township (town in New England) or an extensive area predominantly rural in character. The delimiting of such urban areas by establishing urban-rural boundary zones should be done in advance of the inventory party and a sketch map showing the limits of the area established as an urban compact. However, unknown new development may require the extension of the urban boundaries beyond those shown on office records. The inventory should identify and delimit such extensions. The inventory of cultural features can then be stopped at the urban boundary lines. Inventory of roads and streets within the compact areas should be conducted in the same manner as in rural areas except for omitting the item of culture. Stationing, surface type, and width of both through highways and local streets must be recorded so as to make possible the preparation of mileage tables for each administrative system within these areas.

Delimiting is to be done for all unincorporated urban compacts which have an estimated population of 800 or more, or in places where there are 200 or more houses spaced sufficiently close to form an urban type of development. The procedure is more fully described in Appendix 2.

N. Reservations

Except when otherwise advised, all roads usually open for the use of the public in State and Federal reservations should be inventoried. Reservations will be designated according to standard classification as follows:

National Forest*
National Park
Military Reservations and Installations
Indian Reservations
Other Federal Reservation (indicate kind)
State Jurisdiction
Local

* Forest development roads should be distinguished from National Forest Highways. Purely timber access or other forest development roads should not be included.

The General Staff, U.S. Army, has furnished copies of "Procedures Applicable to Access of Civilian Mapping Agencies to Military Installations." These instructions cover Army, Navy, and Air Force operations and are included in Appendix 4.

O. State and county line roads

All roads on State lines should be inventoried but no off-highway culture need be noted beyond the border of the State under inventory. In the case of a road on a county line, a complete inventory should be made when the road is on the north or west boundary. When the road is on the south or the east boundary, its inventory may be left to the inventory of roads in the adjoining county.

P. Road intersections and identification in the field

At road junctions and intersections, the directions of the other road or roads in relation to the centerline of the road being traveled can be shown in the notes by single lines intersecting the ruled centerline at angles approximately agreeing with the angles formed by the intersecting roads. If each of the intersecting roads is designated by a number on the map provided, or a number has been assigned in accordance with the instructions above, these numbers should be noted on the lines representing them in the notes. If the junction or intersection is definitely identifiable by name, such as the name of a village or crossroads, the name should be recorded at the plotted point in the notes.

Q. Railroad grade crossings

All railroad grade crossings should be inventoried. Details of information to be obtained are given in Section IX, Railroad crossings at grade.

R. Gradient, curvature, and sight distance

The inventory of grades, curves and sight distances will ordinarily require field parties who have received special training in the care and use of specially equipped vehicles. Detailed instructions are contained in Appendix 3. It must be recognized that this activity is hazardous and safety precautions should receive particular emphasis in the conduct of this work.

Section VII. Structures carrying the road and ferries

A. Bridges and culverts [1/]

The location of all bridges, as covered in item I, Roadway structures, under Section VI, should be indicated on the note sheet and the direction of stream flow should also be recorded.

Structures need not be remeasured when an examination of existing records reveals no significant changes. The information for new structures, especially the large structures, should be obtained from plans. The necessary descriptive information and dimensions should be entered on the appropriate form.

Other items to be noted might include:

1. Where there is evidence that the waterway opening is inadequate, a concise description and the location should be recorded.

2. Bridges consisting of two or more spans should be briefly described where necessary to clarify the foregoing data.

3. A complete photographic record of all structures is desirable.

B. Overpasses (Highway over railroad or another highway.)

1. Name of railroad or highway crossed, structure number, if any.

2. Number of railroad tracks, or traffic lanes on road below if bridge is over highway. (Where lanes are not marked, show width of surface or traveled-way.)

3. Type of bridge, length of structure, clearances, brief descriptions, year built, condition, etc., (refer to Bridge Recording and Coding Guide).

1/ See also HPPM, Volume 2, Chapter III, for special instructions on bridge records for defense requirements.

C. Tunnels

Obtain the information including length of structure and roadway clearances, both vertical and horizontal. If toll, so note.

D. Ferries

Record in the inventory notes information as follows concerning all ferries which provide service for motor vehicles:

1. Estimates of width of stream at low water. This information need only be approximate and it is not necessary to make stadia measurements or otherwise delay the progress of the party in obtaining it.

2. Whether toll or free.

3. Type of protection for approaches. Use classifications as given in Section IX.

4. Whether publicly or privately operated.

5. Frequency of service.

Section VIII. Structures over the road

A. High tension lines, conveyors, and similar structures

The locations where high tension lines, conveyors, or similar structures cross over the highway should be recorded on the appropriate form. The minimum overhead clearance should be noted except that all vertical clearances greater than 18 feet may be reported as 18'+. It is not necessary to note local power lines, telegraph, telephone, or guy wire crossings except where they have a minimum clearance of 18 feet or less above the road.

B. Underpasses (Highway under railroad or another road.)

Refer to item B under Section VII and to the Bridge Recording and Coding Guide. However, special handling is required when the highway underpass is incidental to the main function of the overhead bridge. An example of this might be an interstate bridge across a major river and a minor roadway along the river's edge. This underpass would be of a combined type or serve a dual function. In this case the inventory should give information on the span over the highway only.

Section IX. Railroad crossings at grade

Consideration may be given to the preparation of a separate manual of instructions for use in railroad grade crossing data collection. For the performance of this special work, the furnishing of additional instruments and surveying equipment to field parties may be warranted. As a minimum, the inventory should at least meet the requirements of the Procedures Manual, National Railroad-Highway Inventory. Of particular concern in the inventory should be sight distances. Objects restricting sight distances at points 300 feet from the crossing up to 2,000 feet, as measured along the railroad, should be located and sketched. Any buildings or other structures sufficiently close to the crossing to be affected by a future grade separation or to cause further restriction of view as the car approaches closer to the track from the 300-foot point should be noted. Approximate distances to road and track should be recorded, noting the kind of obstruction such as a barn, depot, embankment, trees, etc. If the clear view along the railroad track is 2,000 feet or more, it is not necessary to measure the length of this view. In such cases, the view can be recorded as "unlimited."

It is entirely possible that the view may be greatly restricted at a point 300 feet from the railroad, but becomes much improved or "unlimited" at a point closer to the railroad. If such a condition exists, record should be made of the distance from the centerline of the railroad to the points on either side (no closer than 15 feet to the center of the nearest main track) where greatest sight distance may be obtained; and if it becomes unlimited, show the points where this first occurs when approaching the crossing nearer than 300 feet. The view distances in both directions along the railroad from these points should be noted. In order to identify the crossing later when reports are received from the railroad covering number of trains, accidents, etc., it is important to reference the location wherever possible to the National Railroad-Highway Crossing Inventory Number which is posted at each crossing.

When determining the sight distance from the survey sheet to a crossing with a side track between the observer and the main track, the clear sight distance, as limited by fixed objects other than standing (or moving) railroad cars, should be obtained and reported.

In many cases, other streets intersect the survey street within 300 feet of the crossing. Often these streets are important thoroughfares and the angle of intersection may be such as to constitute a through route across the railroad. When the highway traffic crossing the railroad is distributed over two or more streets that intersect within 300 feet of the crossing, separate

sight distance records should be obtained for each street carrying a substantial share of the traffic involved. Intersecting streets that carry a small proportion of the total traffic over the crossing should not be considered.

Section X. Mail and school bus routes

One objective of the road inventory is to prepare county maps on which may be shown all roads used as mail and school bus routes. It may be found desirable to collect this information in the field, or at least have a field check of the data furnished.

Sources of information about school bus routes will vary in different States. Where field work is necessary to obtain information from local school authorities or bus drivers, interviewing should always be done with the aid of a county or local map of the area. A standard form should be used for tabulating the data concerning roads over which school buses are routed.

Section XI. Special municipal inventory procedures

A. Main routes and connections through cities

Federal-aid primary, Federal-aid secondary, State primary, and U.S. numbered routes through all incorporated places should be logged, and the surface type, width, condition, and the names of the streets inventoried recorded. Surface types should be designated according to the letter classifications in Appendix 5 and widths measured between curbs. Where there are no curbs, the widths to be shown should be those normally available for use by moving and parked vehicles. Any local street which provides a through connection with any of the above described routes within a city should be logged, and surface types and widths recorded. However, no roads or streets within the cities should be logged, where required data may be obtained from city records, urban planning commissions, or other local source.

B. Other streets

In addition to inventorying main routes and connections, all other streets within incorporated urban communities should be logged. This phase generally will be separately programmed and will include logging of all other streets, alleys, and public ways, in cities, villages, and other incorporated communities, with sufficient information obtained to enable a large scale map to be drawn showing the complete network of streets, major water courses, and railroad lines. All streets should be identified by name when the information is available.

It will not be necessary to take width measurements on the "other" streets. Types should be recorded as in Appendix 5. It will not be necessary to measure bridges and railroad crossings on these streets unless the State so desires.

C. Identification of major generators

Urban areas have been placing increased demands upon the States' highway agencies. Among these demands is the requirement to identify and locate major centers of activity. These centers play an important part in the overall system design for an urban area and, therefore, it is important that urban planners know as much about them as possible. Some examples of the kinds of activities to be identified and located are: civic centers, sports arenas, hospitals, universities, shopping centers, airports, etc. The information needed will at least include sufficient data to describe the type, location, and size of the activity being inventoried.

D. Information from city records

To the extent that the information called for can be obtained from city records and where the street layout is correctly shown on a current city map of adequate scale, logging and measurement of city streets may be dispensed with. Care should be taken, however, to see that mileage statistics for the city are complete and current and that maps have been brought up-to-date in respect to the street layout and other features.

E. Identification of corporate boundaries

The location of the incorporated area boundaries should be noted. Where the inventory is to end at a county, village, township, or city line, and such line is not marked where it crosses the right-of-way or roadway being inventoried, the inventory will be continued to a street, road, or structure which will permit the boundary line to be tied in with the location of the structure or intersecting road. Where necessary, a map may be used to scale the distances from a known intersection, or structure, to the boundary in question.

Appendix 1

GLOSSARY

Glossary

Local street or local road

A street or road primarily for access to residence, business, or other abutting property.

Roadway

(General) The portion of a highway, including shoulders, for vehicular use. A divided highway has two or more roadways.

Roadbed

The graded portion of a highway, usually considered as the area between the intersections of top and side slopes, upon which the base course, surface course, shoulders, and median are constructed.

Traveled-way

The portion of the roadway for the movement of vehicles exclusive of shoulders and auxiliary lanes.

Shoulder

The portion of the roadway contiguous with the traveled-way for accommodation of stopped vehicles, for emergency use, and for lateral support of base and surface courses.

Note: These definitions have been included to help establish the frame of reference for discussions in this guide. For more, specific definitions, refer to the list of references given in Appendix 6.

Appendix 2

DELIMITATION OF UNINCORPORATED PLACES

Delimitation of Unincorporated Places

Purpose of delimitation program

The delimitation of unincorporated places enables the Bureau of the Census to enumerate separately the residents within the boundaries of each incorporated place. The names and populations of these places has much value and may be included in published census reports. Delimitation also helps in classifying the urban and rural population of the United States, since the populations of unincorporated places of 2,500 or more are added to the urban population and taken from the rural population. The population of individual places is useful in marketing research, land planning and transportation studies, and other economic and social analyses.

Objectives sought

The objectives of the program to delimit unincorporated places are:

1. To delimit all larger unincorporated places located outside urbanized areas (larger refers to those unincorporated places having estimated populations of 800 or more or with 200 or more housing units).

2. To delimit the smaller unincorporated places that have recognized place names and good visible boundaries (those having populations of 400 to 800 or with 100 to 200 housing units).

3. To obtain a map of each delimited place showing: the place name, county and State names; a population estimate; the boundaries of the place as set in the delimitation procedure; the streets, roads, and streams in each place and their respective names; and the map scale.

NOTE: The urbanized areas referred to above are the continuous, densely settled areas bordering the limits of cities with populations of 50,000 or more. Large unincorporated places within urbanized areas will be identified and delimited by local planning boards or other local authorities.

Definition of unincorporated places

An unincorporated place is a densely settled, population center without legally defined limits or corporate powers. It normally has a street pattern with city-size blocks; its residents live in closely spaced dwelling units; and it has a recognized place name.

This same definition of an unincorporated place must be used nationwide so that all delimitations are uniform. Where some regional differences in the recognition of unincorporated places exist, as in the northeast and in California, they must be disregarded. In the New England States, the total area of each town (towns are county divisions similar to townships in the Midwest) is incorporated and the residents do not always recognize the population centers within the towns as "unincorporated" places. In California, some areas with widely scattered population and with no closely settled nucleus or core are recognized locally as named communities.

Types of unincorporated places

Unincorporated places may be:

1. The extension of a built-up area across and outside a municipality limit.

2. A separate residential area only, or a residential area with a trading or industrial center.

3. A satellite development to a large institution, a military installation, a large construction project or an extractive industry such as mining or lumbering.

Materials furnished by Bureau of the Census

To aid in the delimitation of unincorporated places, the Geography Division of the Bureau of the Census will furnish on request to the State highway agency:

1. Maps showing the boundaries of all incorporated places outside urbanized areas that were delimited for the 1970 census.

2. A 1970 census State report that includes a minor civil division (MCD) or census county division (CCD) map for each State showing the location of each incorporated and unincorporated place recognized in 1970 and also a small outline map for each urbanized area in the State.

Delimitation procedure for larger unincorporated places

In the field examination of the larger incorporated places, a map of each place, supplied by the Bureau of the Census, should be used. A substantial number of these places may require change or adjustment because:

1. Additional development has expanded the limits of the place and boundary revisions are required.

2. The place or a major portion of it has been incorporated or annexed to an adjacent municipality.

3. Demolition has reduced the size of the place or, in rare instances, it may have been completely razed or all buildings removed to a new location.

4. The place name may have changed or the name previously used may not be the best name for the place.

5. Improved boundaries may be selected, e.g., along new roads, highways, etc.

The steps to be taken in the field review of the census of unincorporated places require answers to the following questions:

1. Does the place have 200 or more housing units and do the boundaries closely delimit the built-up area? If the answer is no and adjustments in boundaries cannot correct these deficiencies, the place no longer qualifies as a larger unincorporated place.

2. Are all boundaries distinctly visible features? If the answer is no, a search should be made to locate better boundaries where possible.

3. Is the name locally recognized and is it the most appropriate name for the place? Avoidance of hyphenated names is recommended.

4. Enter all changes on the map provided by the Bureau of the Census or prepare a new map.

Places of the size defined above, not previously recognized, should be identified on maps by field inspection, their limits defined, and names selected by the same procedural steps listed above for reviewing previously established places.

The population estimate may be satisfied in a rough manner by counting the number of occupied housing units enclosed within the boundaries selected and multiplying by a factor of 4.

The boundary of an unincorporated place should set off the population cluster from the open country. Where the fringes surrounding the densely settled core do not have a sharp cut-off from open country, it is difficult to select a good boundary. It is usually better to leave out a few nonfarm dwellings than to include farmsteads within the

boundary. Boundaries should not be extended to include a long string of dwellings along one road; such strings may run for a long distance and are not properly part of the population center. The boundary should set off as compact an area as possible. It is essential that the boundaries selected be easily identified and found by an enumerator.

Boundaries that should be used are:

1. Public streets or roads. An imaginary extension of a street or road may be used for a distance that is no farther than the enumerator can visually follow. An extended line may go from a street end to a river, railroad line, a landmark, or some other point or boundary, but rarely to another street or road.

2. Streams, canals, and other bodies of water.

3. Railroads.

4. High tension lines (on pylons different than regular poles).

5. Park limits that are clearly marked.

6. County boundaries or minor civil division boundaries (townships, towns in New England, etc.).

7. Incorporated place boundaries when the unincorporated place is adjacent to a municipality.

When none of the boundaries listed above can be used, the following boundaries may be used. They should be used infrequently and for the shortest distance needed to connect better boundaries.

1. Ridge lines. A sharp ridge may be used in mountainous or hilly terrain provided that a good connecting boundary from the road (or other boundary) to the ridge can be found.

2. Point to point boundaries. These are direction lines connecting points on the features used as boundaries. The points to be connected must be prominent and visible from one to the other. Examples are a corner, end, or prominent point of:

cemeteries	historical monuments
schools	dams
churches	bridges
factories	golf courses
parks	

The points used must be clearly marked on the map, for example, "N.E. corner Woodlawn Cemetery," "N.W. corner County High School grounds."

3. Offset lines. An offset line is an imaginary line running parallel to and at a prescribed distance from a road or highway, e.g., 200 feet. These are difficult for an enumerator to locate and should be used only when no other boundary can be found or when the standard procedure will create a gross injustice in setting off the closely spaced dwellings from open country. Offset lines should be measured in hundreds of feet or tenths of miles from the road, and should only be used parallel to generally straight roads.

Special boundary rules:

1. When two or more separately named places adjoin, they should be separately delimited with the dividing boundary located in a break in settlement between the developed areas. If the developed areas merge in such a way that they cannot be separated they should be delimited as a single place. (Also see Place names.)

2. Do not extend boundaries across a State line. The developed area in each State should be separately delimited.

3. Boundaries may extend across county lines or minor civil division boundaries (such as townships, towns in New England, New York, or Wisconsin) if the closely spaced housing units lie on both sides of the line. If there are less than 50 dwelling units on one side of a political line, these may be omitted and the political boundary line used as the place boundary.

Place names

1. Use the locally recognized place name for each place. Well established place names in many instances are shown on maps of the area.

2. When two or three separately named places adjoin and cannot be separately delimited, a hyphenated name may be used, such as Westgate-Waverly. Delineate separately and avoid hyphenated names if at all possible.

3. When more than one name for a single population center is shown on maps, use the locally recognized name. If the second name applies to only a small section of the built-up area, use the

name that designates the larger area and note this fact on the map, for example, "The name Tuxedo Junction applies to a small industrial area included in Tuxedo."

4. If an unincorporated place adjoins an incorporated place but has no generally accepted name, it may be given the name of the incorporated place with a directional designation following such as "Rockville East."

Delimitation procedures for small unincorporated places

The procedures to be followed in delimiting the small unincorporated places with 100 to 200 housing units are identical with those for the larger unincorporated places except for the additional requirements listed below:

1. Each place must have a single name that is locally recognized or it must adjoin an incorporated place.

2. Each place must have well-defined, visible boundary features (not including any alternative boundaries as described earlier) for roughly two-thirds of its limits if in a suburban location or one-third of its limits if located in open country or a rural area.

Map Specificiations

If the map prepared by the Bureau of the Census is used, it should be edited and revised as necessary. Otherwise, a new map should be prepared.

If a new unincorporated place is delimited, a map should be prepared which meets the following specifications:

1. Map scale of about 1 inch to 1000 feet is preferred, but a somewhat larger or smaller scale is acceptable.

2. Graphic scale should be shown on map.

3. Name of place, county name, and State name should be included.

4. North arrow must be shown.

5. All streets, roads, highways, streams, canals, water bodies, and other prominent landmarks (both within the limits and nearby) should be shown.

6. All features under specification 5 should be identified, if possible, by name, including the numbers of any county, State or Federal highways.

7. Boundary limits for unincorporated places should be clearly marked and names of boundary segments supplied.

8. Population or number of housing units should be estimated and figures marked on map under place name and identification.

9. Enough surrounding map detail should be given to enable the Bureau of the Census to locate the unincorporated place on a State or county highway map.

Appendix 3

GRADIENT, CURVATURE, AND SIGHT DISTANCE

Gradient, Curvature, and Sight Distance

A special party should be organized to obtain information in rural territory relating to gradient, curvature, and sight distance on the main and improved roads, and when desired, on other roads which may be selected. When preferred, however, grade information may be collected in the course of the regular inventory over such roads as have been previously designated. When "as built" plans or straight line diagrams are readily available, the gradient and curvature data may be transcribed from office records, care being taken to establish sufficient ties to enable the notes to be correlated with the inventory log.

The standards set up for the measurement of gradient, curvature, and sight distance, by agreement between the State and the Federal Highway Administration, may vary for sections of roads through flat, rolling, and mountainous terrain.

A. Gradient

Record should be made of the percent of grade preceded by plus (+) or minus (-) to indicate whether ascending or descending in the direction of survey. A gradometer or clinometer may be used for the purpose of determining the rate of grade. Where the grade is uniform, it may be measured by sighting the instrument parallel with the road surface. Where the gradient is irregular, the instrument may be sighted on a point selected at the approximate height of the observer a sufficient distance ahead to determine the average grade of the road.

In case the grade instrument is one designed to be attached to the car, care must be taken to see that the car stands on a section of road representative of the average gradient. If observations are to be made while the car is in motion, it is equally essential that a uniform low speed be maintained while grade measurements are being taken.

B. Curvature

On all primary highways and other designated roads, the length and location of each major curve should be noted. The location of the PC and PT, degree of curvature, and whether to the right or left should be recorded in the notes.

C. Sight Distance

For sight distances on the traveled-way of the Interstate System, instructions contained in HPPM, volume 20, appendix 20, should be followed. On all other heavily traveled highways (those carrying

2,000 vehicles or more a day), sight distance information should be obtained so that a graph can be plotted showing a continuous record of sight distances on the road for both directions of travel. Within restricted zones, the kind of location of fixed objects or terrain that interrupt the driver's view should be recorded and notes made as to whether they result from horizontal or vertical curvature, or both.

A continuous sight profile will not be required for roads (other than those on the Interstate System) carrying an average daily traffic volume ranging from 1,000 to 2,000 vehicles. However, note should be made of the beginning and ending points of each zone of restriction so that, for any selected mileage, the accumulated length and percent of any road found to have substandard sight distances can be obtained. This will also permit the determination of the number of restricted sections occurring. The minimum sight distance observed at each horizontal and vertical curve should likewise be recorded.

In the same manner, sight distance observations may be made on roads having an average daily traffic volume ranging from 500 to 1,000 vehicles. For further reference, see "Stopping and passing sight distances" tabulated in the AASHTO "Policy on Geometric Design of Rural Highways."

Appendix 4

PROCEDURES APPLICABLE TO THE ACCESS OF CIVILIAN MAPPING AGENCIES TO MILITARY INSTALLATIONS

Procedures Applicable to the Access of Civilian Mapping Agencies to Military Installations*

1. Application

The principles outlined herein apply to all maps, aeronautical charts, hydrographic charts, air approach charts, sketches of all scales and to any other documents that serve to fix definitely the military installation and disclose features of functioning characteristics of elements thereof or related thereto.

2. Definitions

a. The term "military installations" as used herein includes posts, camps, stations, reservations, airfields, airports, seaplane bases, anchorages, and other areas under the supervision and/or control of the U.S. Army, the U.S. Navy, and/or the U.S. Air Force.

b. Civilian mapping agencies are defined as non-military mapping agencies of the U.S. Government, including commercial contractors thereto, but excluding commercial contractors of the Military Departments.

3. Procedures

a. Prior to mapping any area containing a military installation, a civilian mapping agency should consult the U.S. Geological Survey (USGS) with regard to existing large scale (1:24,000) map coverage of the installation. The USGS may also have aerial photography available of the installation of interest.

b. All published maps that are not copyrighted depicting military installations are available without further referral to the Military Departments. The Federal mapping agencies do not copyright maps.

c. A request to enter a military installation to map or survey it by a civilian mapping agency should be submitted in writing to the appropriate addressee listed below:

(1) Army: Commanding General, appropriate Army command

(2) Navy: Commandant, appropriate naval district

(3) Air Force: Commander, appropriate major command

Department of Defense instruction dated December 23, 1965

The request should indicate the purpose of the final map, the exact area to be mapped, the approximate data and duration of the survey, the approximate number of personnel involved and it should request copies of any existing maps or plans of the military installations that may be available.

d. A request must be submitted to each of the following military addresses when a civilian mapping agency determines that flying of aerial photography is required of an area that includes a military installation:

(1) Office, Chief of Engineers, U.S. Department of the Army, Washington, D.C. 20310

(2) Chief of Naval Operations, U.S. Department of the Navy, Washington, D.C. 20350

(3) Headquarters, U.S. Air Force, Assistant Chief of Staff, Intelligence, Directorate of Collections, Rm. 4B141, Pentagon, Washington, D.C. 20330

The request should indicate the exact area to be photographed and the approximate dates of required overflights.

e. The appropriate military addressees in subparagraph c and d above will process the request and notify the requesting agency in writing of approval or disapproval of the requests with reasons therefore. If approved, the notification will include:

(1) A list of military installations in the area with their official names and general location.

(2) A statement that the commanders of affected military installations have been notified of the projected visit or overflight.

(3) A request that the mapping party report to the commanding officer or his representative upon arrival at and again prior to departure from the installation. The chief of the party should advise the Military Commander of the purpose and results of the party's work.

(4) A direction that coordination with appropriate military installation commanders will be made prior to authorized overflights for aerial photography by the civilian mapping agency to preclude problems arising during training such as artillery or rocket firing.

4. Security Measures

a. Military Departments may authorize civilian agencies to survey classified features and to include them on their compilations for the use of military mapping agencies; however, all classified matter will be omitted from the drafting copy and the published map of the civilian agency.

b. In order to insure the security of military information made available to civilian mapping agencies, the following measures will be employed:

(1) While a mapping party is engaged in work at or on a military installation, the commander thereof will take such action as necessary to insure the safeguarding of classified military information by the mapping party, to include furnishing adequate storage facilities.

(2) The appropriate military addressees listed in paragraph 3.c. above will review the compilation and drafting copies of the civilian mapping agency covering military installations, to determine what information contained therein should not be included on a map designed for public release, and will inform the civilian agency as soon as practicable as to:

(a) Classification of items on the compilations; and

(b) Deletions from the drafting copy.

Appendix 5

CLASSIFICATION OF ROAD TYPES

Classification of Road Types

Each unique section of a road should be classified and a record made on the appropriate inventory form. It is preferred that the standard construction type codes be used in the description of each of the road sections. This will provide a uniform basis for comparison and for reporting requirements. (Refer to PPM 20-1 in the Federal-Aid Highway Program Manual, volume III, chapter 6, for more specific information on highway classification construction type codes.)

The construction type codes are:

A. Primitive road (type A)

An unimproved road (on which there is no public maintenance) usable by 4-wheel drive vehicles and publicly traveled by small numbers of vehicles.

B. Unimproved Road (type B)

A road composed wholly (with minor exceptions) of the natural ground of the region traversed, which may or may not have been bladed, which does not conform in respect to alinement, grade, and drainage to at least the definition of a "Graded and Drained Earth Road" and on which the only work that has been done is that required to maintain a condition of bare passability for motor vehicles.

C. Graded and Drained Earth Road (type C)

A road of natural earth alined and graded to permit reasonably convenient use by motor vehicles and sufficiently drained by longitudinal and transverse drainage systems (natural or artificial) to prevent serious impairment of the road by normal surface water. A dust palliative treatment or a continuous course of special borrow material may have been added to protect a new roadbed temporarily and to facilitate immediate traffic service.

D. Soil-Surfaced Road (type D)

A road of natural soil, the surface of which has been improved to provide more adequate traffic service by the addition of: (1) a course of mixed soil having soil classification A-1 or A-2 characteristics, such as sand-clay, soft shale, or topsoil, or (2) an admixture such as bituminous material, portland cement, calcium chloride, sodium chloride, or fine granular material (sand or similar material).

(D-1) Not Graded and Drained
A road of the type described above but having little or no grading or drainage, built to no engineering standards, and considered to be less than that which would qualify for the designation "Graded and Drained."
(D-2) Graded and Drained
A road of the type described above and possessing qualities of alinement, grading, and drainage at least equal to those described under "C."

E. Gravel or Stone Road (type E)

A road, the surface of which consists of gravel, broken stone, slag, chert, caliche, iron ore, shale, chats, scoria, disintegrated rock, or other similar fragmental material (coarser than sand).
(E-1) Not Graded and Drained
A road of the type described above but having little or no grading or drainage, built to no engineering standards, and considered to be less than that which would qualify for the designation "Graded and Drained."
(E-2) Graded and Drained
A road of the type described above and possessing qualities of alinement, grading, and drainage at least equal to those described under "C."
(E-3) Stabilized or Oiled Surface
A road of the type described under (E-2), the surface of which has been stablized with sand-clay, bituminous, chemical or portland cement admixture, or given light penetrations of oil or chemical to serve as a dust palliative.

F. Bituminous Surface-Treated Road (type F)

An earth road, a soil-surfaced road, or a gravel or stone road to which has been added, by any process, a bituminous surface course with or without a seal coat, the total compacted thickness of which is less than 1 inch. Seal coats include those known as chip seals, drag seals, plant-mix seals, and rock asphalt seals.

G. Mixed Bituminous Road (type G)

A road, the surface course of which is 1 inch or more in compacted thickness, composed of gravel, stone, sand, or similar material, mixed with bituminous material under partial control as to grading and proportions.
(G-1) Low Type
A mixed bituminous road as above described, the base course of which is a nonrigid type and the combined thickness of surface

and base is less than 7 inches.
(G-2) Paved or High Type
A mixed bituminous road as described, the base course of which is a rigid type of any thickness or a nonrigid type of such thickness that the total depth of surface and base is 7 inches or more in compacted thickness.

H. Bituminous Penetration Road (type H)

A road, the surface course of which is 1 inch or more in compacted thickness composed of gravel, stone, sand, or similar material bound with bituminous material introduced by downward or upward penetration.
(H-1) Low Type
A bituminous penetration road as above described, the base course of which is a nonrigid type and the combined thickness of surface and base is less than 7 inches.
(H-2) Paved or High Type
A bituminous penetration road as above described, the base course of which is a rigid type of any thickness or a nonrigid type of such thickness that the total depth of surface and base is 7 inches or more in compacted thickness.

I. Bituminous Concrete, Sheet Asphalt, or Rock Asphalt Road (type I)

A road of which has been constructed a surface course of 1 inch or more in compacted thickness consisting of bituminous concrete or sheet asphalt, prepared in accordance with precise specifications controlling gradation, proportions, and consistency of composition, or of rock asphalt. The surface course may consist of combinations of two or more layers such as a bottom and top course, or a binder and a wearing course.

J. Portland Cement Concrete Road (type J)

A road consisting of portland cement concrete with or without a bituminous wearing surface less than 1 inch in compacted thickness.

K. Brick Road (type K)

A road consisting of paving brick with or without a bituminous wearing surface less than 1 inch in compacted thickness.

L. Block Road (type L)

A road consisting of stone block, wood block, asphalt block, or other form of block, except paving brick, with or without

a bituminous wearing surface less than 1 inch in compacted thickness.

M. Combination Type Road (type M)

A road, the wearing course of which consists of two or more individual types each being of such depth as to be classed logically as a part of the traffic-bearing road surface rather than as surfaced shoulders.

A surface widened by strips, which may or may not provide sufficient width to add one or more lanes to the road, but which are inadequate in type and depth to serve the traffic needes of the road, is to be regarded as a road with surfaced shoulders. This applies whether or not the shoulders have been treated with bituminous material.

In the case of resurfacing on existing type F roads, when the added thickness becomes sufficient to increase the combined thicknesses of the bituminous courses to 1 inch or greater, the type F road will then be reclassified as type G, H, or I according to the predominant character of the bituminous courses.

In the case of resurfacing on existing type G, H, I, J, K, or L roads, the added thickness must be 1 inch or greater before the road will be reclassified. The road is then to be classified according to the character of the retread, except that type G-1 and H-1 roads will not be reclassified unless the total thickness of surface and base becomes 7 inches or more.

Where a road is graded through natural sand-clay, gravel, or stone soil of a character sufficiently definite to justify inclusion of the road surface in one of these classes, the road should be classified under type D or E even though the material has not been hauled in to provide a wearing surface of these materials. Short stretches of these types of roads less than 1/4-mile long should not be considered in this connection.

The above classifications are generally based on work done and materials used on the road. If the results of the work are not now visible and the road has reverted to a lower type by reason of failure, wear and tear, or disintegration, the lower type classification should be used.

Where the bituminous classifications (F, G, H, or I) cannot be determined in the field, surfaces of this general type should be reported as low-type bituminous or high-type bituminous as

the case may be. Reconciliation with construction records or the road life project log will be made at a later date so that the proper surface classification may be shown and field notes corrected as required.

Appendix 6

REFERENCES

REFERENCES

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