

**RECOMMENDATIONS ON ADDRESSING IN SUPPORT OF
ADDRESS MATCHING AND GEOCODING**

Adopted
April 12, 1995

Prepared by
Database and Resource Development Subcommittee

Maryland State Government Geographic Information Coordinating Committee
MSGIC 004 4/95

STATE OF MARYLAND
Parris N. Glendening, Governor

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PREFACE

The Maryland State Government Geographic Information Coordinating Committee (MSGIC) serves as the focal point for the coordination of State agency GIS activities. MSGIC supports the development of geographic data sets that are useful to multiple State agency purposes. MSGIC also recognizes that it is individual State agencies who are principally responsible for developing and maintaining the specific data sets for spatial analysis and display.

The purpose of this report is to make recommendations on addressing standards which will enhance the ability to use geographic information systems to determine the coordinate location of street address information maintained in agency databases.

Street addresses are one of the most commonly used references for locating information. Many agencies and organizations in both the public and private sector maintain databases in which the street address is part of the record. Using MSGIC's infrastructure base maps the x,y coordinate location of an address in a database can be determined (i.e., geocoded or address matched).

The geocoded address records are used with geographic information systems software to assist in problem solving. For example, 911 calls for service can be located on a digital street map as an aid in dispatching, school bus routes can be determined based on the location of students and health concerns (e.g., incidents of lead paint poisoning) can be spatially displayed to aid in developing abatement strategies.

The report makes three recommendations that, if implemented, will enhance the ability to use geocoded addresses for improved decision-making. The first recommendation concerns the adoption of database addressing standards where an agency has an interest in spatially displaying, on a street map, information from its databases. The second recommendation is for improving the completeness and accuracy of the street address information in MSGIC's infrastructure base maps. The third recommendation encourages agencies to use the MSGIC infrastructure base maps, in conjunction with commercially available software, to perform their geocoding and spatial analysis functions.

ABSTRACT

This report provides the recently adopted MSGIC recommendations on addressing standards and the background information supporting the adoption of these recommendations. The implementation of these recommendations will enhance the ability to use geographic information systems to determine the coordinate location of street address information maintained in agency databases.

Street addresses are one of the most commonly used references for locating information. Many agencies and organizations in both the public and private sector maintain databases in which the street address is part of the record. Using MSGIC's infrastructure base maps the x,y coordinate location of an address in a database can be determined (i.e., geocoded or address matched).

The geocoded address records are used with geographic information systems software to assist in problem solving. For example, 911 calls for service can be located on a digital street map as an aid in dispatching, school bus routes can be determined based on the location of students and health concerns (e.g., incidents of lead paint poisoning) can be spatially displayed to aid in developing abatement strategies.

The report makes three recommendations that, if implemented, will enhance the ability to use geocoded addresses for improved decision-making. The first recommendation concerns the adoption of database addressing standards where an agency has an interest in spatially displaying, on a street map, information from its databases. The second recommendation is for improving the completeness and accuracy of the street address information in MSGIC's infrastructure base maps. The third recommendation encourages agencies to use the MSGIC infrastructure base maps, in conjunction with commercially available software, to perform their geocoding and spatial analysis functions.

We encourage the widespread distribution of this report. Feel free to make and distribute copies to others in your organization.

Summary of Recommendations on Addressing

Recommendation 1: State agencies should adopt elements of the U.S. Postal Service's addressing standards where there is an interest in using computer mapping software to identify the geographic location of records (e.g., client, service provider, facility or incident records) that contain an address.

Valid database addresses for address matching and geocoding have the following elements: Street Number, Prefix Directional, Street Name, Street Type, Suffix Directional, Post Office (City/Town), State, ZIP and County. (See Attachments I and II).

Recommendation 2: Immediate steps should be taken to improve the premise address fields in the Department of Assessments and Taxation's (DAT's) parcel database. Specifically:

- Where local jurisdictions are implementing enhanced 911 systems that result in conversion of the premise address from a rural to city style address, there are opportunities to add the new city style address to the parcel data base. DAT and the Department of Public Safety and Correctional Services' Emergency Number Systems Board should work cooperatively, under the MSGIC umbrella, with the local jurisdiction addressing authorities to accomplish this.
- Where new parcels (and in particular parcels with improvements) are added to DAT's parcel data base the completion of the premise address fields should be mandatory for acceptance of the record for data entry.
- Where the owner's address in DAT's parcel database is a complete and accurate city style address, the parcel is denoted as owner occupied and the premise address fields are incomplete, then the owner's address should be reviewed by DAT to determine if it can be used to complete the premise address fields.

In implementing the above, DAT should give the highest priority to new parcels, parcels with improvements added since 1989 and parcels in jurisdictions converting to city style addressing to support enhanced 911 systems.

Recommendation 3: State agencies developing an in-house address matching and geocoding capability should adhere to the following:

- In determining their requirements for computer hardware and address matching software, State agencies should seek the advice and guidance of MSGIC's Technical Assistance and Uses and Applications Subcommittee.
- In preparing their database files for address matching, State agencies should follow the guidelines for standardization of address information (see Attachment III).
- In meeting their needs for a geographic file and digital street map, State agencies should acquire and use the MSGIC supported MDlandbase files and accompanying

I. Why Adopt Standardized Addresses

From MSGIC's perspective, the use of standardized addressing enhances the ability to use a geographic file (e.g., TIGER/line or MDlandbase, see Attachment IV) to determine the coordinate location of an address record in a database file. This is called address matching or geocoding.

Standardized addressing in a database file is also of benefit where the address information serves as the basis for generating mailpieces. The use of standardized addresses that meet postal format requirements result in improved mail processing and delivery, reduced undeliverable-as-addressed mail and lowered costs associated with mailing.¹

The adoption of standardized addressing benefits activities related to both geocoding and mailing. In determining whether to adopt or improve their address standards, State agencies should consider the benefits from both these activities.

II. How Address Matching Works

Addresses are one of the most commonly used references for locating information. Many agencies and organizations maintain extensive databases in which the street address is part of the record. Address matching or geocoding is the process by which the address fields in the database are assigned a x,y coordinate location (typically in latitude and longitude or State plane coordinates).

Address matching is usually an option or module incorporated into commercially available mapping software. The geocoding software compares the address of each record in the database with a geographic file that references the address to its location on a digital street map. When a match is found, the x,y geographic coordinates are assigned to the address of the database record (see Diagram 1). Additionally, if the street segments in the geographic file have been assigned their census geographic area code (i.e., census tract, block group and block) they will also be assigned to the database record.²



Diagram 1: The Geocoding Process

Once geocoded, the location of each database record can then be displayed as a color dot or symbol on a map, typically referred to as "pin maps". Maps often identify clusters or patterns to the data which may otherwise go undetected. Other important information such as major roads, bus routes and fixed rail lines can also be displayed on the map (see Diagram 2).

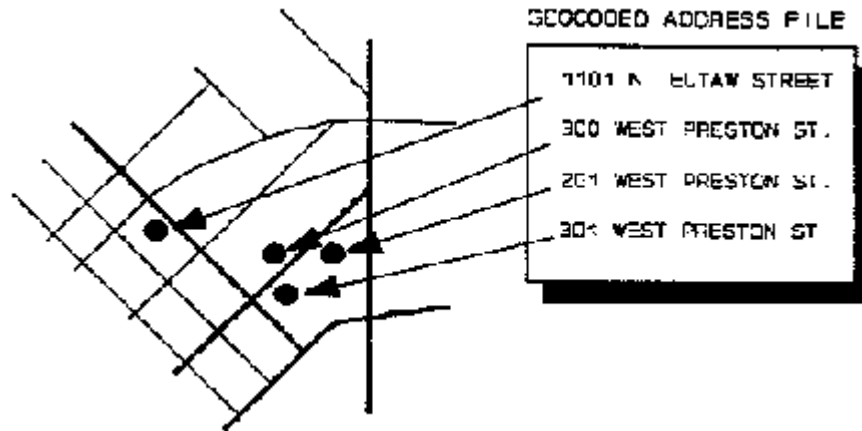


Diagram 2: Map Display of Geocoded Address File

III. How Address Matching is Used

Some examples in Maryland are:

A. Public Safety and Law Enforcement

911 emergency dispatch operators use geocoding to determine what police, fire or medical resources need to be dispatched to an incident or call for assistance.

The Maryland State Police and local law enforcement agencies analyze the distribution of crimes located by address to identify patterns and allocate manpower resources.

B. Education

Students are assigned to specific schools based upon the school district in which they live. School district boundaries are realigned to reduce overcrowding based on the geocoded addresses of the children.

School bus routes are created and realigned based upon the geocoded location of students.

C. Tax Revenue Allocation

The Comptroller's Office uses address matching and geocoding to properly distribute the piggyback income tax to the county and/or municipality in which the taxpayer lived during the tax year.

The Department of Assessments and Taxation uses address matching to map the distribution of property assessment appeals to identify clusters or patterns.

D. Health and Environment

The Department of the Environment uses address matching to map the distribution of children tested for blood lead poisoning in Maryland. The specific locations where the problem is prevalent are identified to assist in developing strategies to address the health issue.

E. Delivery of Products and Services

Businesses use address matching to identify the exact location of existing customers. New offices or distribution centers are located in relation to customers.

Delivery trucks are efficiently routed from one address to another along a delivery route once the address of each stop has been located.

IV. What is Required for Good Addressing Matching

A. Database File Address Requirements

The database file you wish to address match or geocode must contain good address information. The addresses that appear in your database must be complete and follow commonly accepted standards in order to achieve a high match rate with the geographic file (i.e. the digital street map).

The addressing standards prescribed by the U.S. Postal Service for addressing mail are inclusive of the requirements for good address matching (see Attachment I for a more complete discussion of U.S. Postal Service standards for addressing mail). Listed below are the recommended postal service address components.

Components:

Non Address Data:*,**

Information/Attention:*,**

Name of Recipient:**

Delivery Address:

Example:

Jon 0443-66H

Harry Jones President

Acme Insurance

300 E Main St Rm 1121

Post Office, State, ZIP: Ellicott City MD 21043

* Optional for address mail delivery.

** Not needed for address matching or geocoding.

(Note: While room/apartment/suite may be part of the Delivery Address, it is not used in geocoding).

The component elements of the address format that are required for address matching are:

<u>Component:</u>	<u>Elements:</u>	<u>Example:</u>
Delivery Address	Street Number	300
	Prefix Directional*	E
	Street Name	Main
	Street Type	St
	Suffix Directional*	(none in this example)

*Only required where applicable.

In addition to the required component elements, the following elements are desirable for improved address matching:

<u>Component:</u>	<u>Elements:</u>	<u>Example:</u>
Post Office, State, ZIP	Post Office (City/Town)	Ellicott City
	State*	MD
	ZIP	21043
County	County**	Allegany

* Required when dealing with addresses from multiple states (See recommended codes, Attachment II).

** Required when dealing with addresses from multiple jurisdictions (See recommended codes, Attachment II).

The following types of delivery addresses cannot be used for address matching or geocoding:

<u>Type:</u>	<u>Example</u>
Blank Address	(i.e., no entry of Street Number, Street Name, or Street Type)
Post Office Box	P.O. Box 184
Rural Route	RR Box 10

Highway Contract Route HC 2 Box 10
 Rm/Apart/Suite # without Rm 1101
 Street Address
 Organization Name without e.g., Towson State University
 Street Address ³

While a post office box address serves the Postal Service adequately for mail delivery, it cannot be used for geocoding. In Maryland, all jurisdictions are assigning geographically locatable addresses (i.e., city style addresses of the format required for geocoding) in order to support the delivery of emergency services. The Postal Service is willing to adopt city style addresses, replacing the rural style address for mail delivery, when the local addressing authority implements its locatable addressing system. During the conversion period it is possible that an addressable location may have both a rural style and a city style address. While not recommended, the Postal Service will accept the following dual addressing where the mail will be delivered to the address on the Delivery Address line:

GRAND PRODUCTS INC.
 100 Major St

Mail will be delivered here: PO Box 200
 Princess Anne MD 21853

For purposes of geocoding the good address is 100 Major St. Agency database records should accommodate, where necessary, dual addresses in order to meet the delivery address requirements for both mailing and geocoding.

Attachment III provides recommended guidelines for standardization of your database file address information in preparation for address matching and geocoding.

Recommendation 1: State agencies should adopt elements of the U.S. Postal Service's addressing standards ⁴ where there is an interest in using computer mapping software to identify the geographic location of records (e.g., client, service provider, facility or incident records) that contain an address.

Valid database addresses for address matching and geocoding have the following elements:

<u>Address Elements:</u>	<u>Geocoding Requirement:</u>	<u>Examples:</u>
Street Number	required	e.g., 101, 10908
Prefix	required where	N, E, S, W, NE, SE,

Directional	present	SW, NW
Street Name	required	One or More Words
Street Type	required	e.g., AVE, RD, ST, WAY, LN
Suffix Directional	required where present	N, E, S, W, NE, SE, SW, NW
Post Office	desirable	City, Town, Place
State ⁵	desirable	e.g., MD, PA, WV, DE
ZIP	desirable	e.g., 21208, 21201, 21117
County ⁵	desirable	23 Counties and Baltimore City

B. Geographic File Address Requirements

In address matching or geocoding the address in your database file is matched to the corresponding address information in the geographic file (See Diagram 1). The geographic file is a digital street map in which address ranges are stored for each street segment (typically that portion of a street intersected by other streets). The street segments are stored with the beginning and ending address for each segment, differentiating between the left and right sides of the street. For example:

Street Name	Address Range:		Address Range:	
	<u>From Left</u>	<u>To Left</u>	<u>From Right</u>	<u>To Right</u>
N Main St	205	293	208	296
N Main St	303	395	302	394
N Main St	401	499	404	490

To match "345 N Main St" from your database file, the geocoding software scans the address ranges in the geographic file until it finds a match. Since 345 is between 303 and 395, the database record is matched to the left side of the middle (highlighted) record in the above table. The appropriate geographic location along that street segment is then calculated to derive the x,y location to be assigned to the database record.

In order for there to be a high percentage of matches between the addresses in the database file and the geographic file, there must be good addresses in the database file (see prior discussion in Section IV.A. on Database File Address Requirements) as well as up-to-date and current streets with address range information in the geographic file (i.e., the digital street map).

Changes to addresses in existing developed areas as well as new streets and roads segments and their address ranges must be added to the geographic file. Additionally, as jurisdictions in Maryland switch from rural style addresses (route # and P.O. Box #) to city style addresses, the city style addresses must be incorporated into the geographic file since only city style addresses can be successfully geocoded.

MSGIC, through its Digital Infrastructure Base Maps, is addressing the need to develop and maintain an up-to-date geographic file and digital street map.

The MSGIC Digital Infrastructure Base Maps consist of a road/address layer and digitized parcel x,y reference points. There are actually five separate components which go into their creation: (1) State Highway Administration road grid maps; (2) U.S. Census Bureau TIGER/Line files; (3) "conflated" SHA/TIGER (MDlandbase) files which combine the cartographic detail of the SHA road maps with TIGER/Line street segment and address range information; (4) scanned, raster images of the parcel maps with vector updates for new parcels; and (5) digitized parcel x,y reference points linked to the parcel database. The production of these base layers is a cooperative effort of the State Highway Administration, Bell Atlantic, the Maryland Office of Planning and the Department of Assessments and Taxation. The data has an overall map accuracy of 1:24,000. Components (2), (3) and (4) are described in more detail below and are essential to providing improved geocoding and address matching capabilities for Maryland government agencies.

U.S. Census Bureau TIGER/Line Files

The U.S. Census Bureau's TIGER/Line file is a geographic and digital street address file that was prepared for the 1990 Census. The TIGER/Line file is available for each county in the United States and includes geographic areas such as census tracts and census blocks. The most recent version of the TIGER/Line file reflects good address range coverage for areas with traditional city style addresses as of the 1990 Census.

Conflated SHA/TIGER (MDlandbase) Files

Under a cooperative data exchange agreement between the State of Maryland and Bell Atlantic, the TIGER/Line files for Maryland's 23 counties and Baltimore City are being enhanced. The enhanced files, MDlandbase, replace the poor cartographic quality of the TIGER/Line digital street map with the State Highway Administration's (SHA) 1:24,000 Grid Map Series. The MDlandbase files include the street address range information available from the Census Bureau's most recent TIGER/Line file. The street name and address range information is also supplemented with data derived from Bell

Atlantic's PREMIS data base which includes the addresses of telephone customers.

Digitized Parcel x,y Reference Points

The State of Maryland anticipates contributing to the maintenance and updating of the MDlandbase files. Updates to the SHA Grid Maps show where new roads and changes to existing roads have occurred. The Maryland Department of Assessments and Taxation (DAT) in partnership with the Maryland Office of Planning (OP) is automating its parcel maps and establishing parcel x,y reference points that are linked to the assessment database record for each parcel. The x,y parcel reference points are located within the parcel boundaries as well as along the road network in SHA's digital Grid Maps (i.e., the same road network used for MDlandbase). As parcels are added or changed, the x,y reference points can be used to update the address ranges along new roads in MDlandbase. This is because DAT's parcel database record (with its x,y reference point) contains the following data fields:

Premise Street Number
Premise Street Suffix
Premise Street Name
Premise Street Type
Premise Street Direction
Premise City
Premise ZIP CODE (Zip + 4)

The DAT parcel premise address fields conform very closely to the Postal Service Address standards. However, the current quality and completeness of the data in these fields varies from jurisdiction to jurisdiction. The DAT parcel database also contains separate fields for the parcel owner's address. Since these fields are related to the mailing of assessment notices and tax bills they are currently maintained and updated with a higher priority than are the premise address fields.

Recommendation 2: Immediate steps should be taken to improve the premise address fields in the Department of Assessments and Taxation's (DAT's) parcel database. Specifically:

- **Where local jurisdictions are implementing enhanced 911 systems that result in conversion of the premise address from a rural to city style address, there are opportunities to add the new city style address to the parcel data base. DAT and the Department of Public Safety and Correctional Services' Emergency Number Systems Board should work cooperatively, under the MSGIC umbrella, with the local jurisdiction addressing authorities to accomplish this.**

- **Where new parcels (and in particular parcels with improvements) are added to DAT's parcel data base the completion of the premise address fields should be mandatory for acceptance of the record for data entry.**
- **Where the owner's address in DAT's parcel database is a complete and accurate city style address, the parcel is denoted as owner occupied and the premise address fields are incomplete, then the owner's address should be reviewed by DAT to determine if it can be used to complete the premise address fields.**

In implementing the above, DAT should give the highest priority to new parcels, parcels with improvements added since 1989 (i.e., addresses not in the Census Bureau's TIGER/Line file) and parcels in jurisdictions converting to city style addressing to support enhanced 911 systems (in particular, where the local addressing authority is referencing the new city style addresses directly to the parcel account number or the parcel map/grid/parcel/section/block/lot number).

C. Commercial Software Requirements

Most of the commercially available mapping packages that can access and use geographic and digital map files (e.g., the TIGER/Line and the MDlandbase files) have address matching and geocoding capabilities. Among the software products currently being used by State agencies for address matching are: ARC/INFO, MapInfo, Atlas*Pro and TRANSCAD. The specific procedures and features for performing address matching vary from package to package and are described in the user manuals and documentation that accompany the packages (see Section V, References). MSGIC's Technical Assistance and Applications and Uses Subcommittee can provide assistance to State agencies in evaluating the various software packages and hardware requirements needed to support the commercially available software.

The same vendors that sell geocoding software as well as other private vendors (e.g., ERDAS, GDT) market and sell geographic and digital map files. Typically these files are marketed as superior to the Census Bureau's TIGER/Line files in terms of both completeness (new road features, new address ranges) and accuracy (improved cartographic quality of the road network).

Maryland government agencies have access to the existing TIGER/Line files and the enhanced MDlandbase files. The MDlandbase files meet the requirements for more complete and accurate digital street map files for Maryland's 23 counties and Baltimore City (see discussion in Section IV.B. on Geographic File Address Requirements). Both the TIGER/Line and MDlandbase files are distributed by the Office of Planning to Maryland government agencies for a nominal fee (see Attachment IV, MDlandbase License Agreement).

Recommendation 3: State agencies developing an in-house address matching and geocoding capability should adhere to the following:

- In determining their requirements for computer hardware and address matching software, State agencies should seek the advice and guidance of MSGIC's Technical Assistance and Uses and Applications Subcommittee.
- In preparing their database files for address matching, State agencies should follow the guidelines for standardization of address information (see Attachment III).
- In meeting their needs for a geographic file and digital street map, State agencies should acquire and use the MSGIC supported MDlandbase files and accompanying census boundary files (see Attachment IV). Similar proprietary files sold commercially should not be purchased unless it is first determined that MDlandbase cannot meet an agency's needs for high quality address matching and geocoding.

V. References

Environmental Systems Research Institute, Inc., ARC/INFO Network User's Guide, Redlands, California, 1992, Chapter 9.

Strategic Mapping, Inc., Using Atlas*Pro, Santa Clara, California, 1992, Chapter 9.

MapInfo Corporation, MapInfo Reference Manual, Troy, New York, 1994, pp. 126-130, Appendix C.

U.S. Postal Service, Postal Addressing Standards, Publication 28, National Address Information Center, Memphis, TN (1-800-238-3150), January 1992.

U.S. Department of Commerce, Bureau of the Census, TIGER/Line™ Files, 1992, Technical Documentation, Washington, D.C., 1993.

ATTACHMENT I

Postal Addressing Standards

The U.S. Postal Service has developed standards (Postal Addressing Standards, Publication 28) for mailing addresses that are designed to reduce address confusion. A primary focus is placed on the order of the address components, some recommended sizes for those components and standardization of abbreviations to facilitate the use of automated mail sorting technology. In addition, they maintain and provide automated address range files for use with commercially available computerized mail standardization and sorting software. Using such software and postal system address range lists reduces bulk mailing costs for the mailer.

The Postal Addressing Standards from Publication 28 are summarized below along with appendices from the publication.

ADDRESS FORMAT

Addresses should be complete and include secondary address designators such as directionals (e.g. N, NE, S,SW) and apartment, suite, or room numbers.

The recommended address format is shown below and described in the following paragraphs. Each line of the address is discussed, starting from bottom to top.

(Optional)	Non Address Data:	FEL 01225-66H
(Optional)	Information/Attention:	HARRY FELDMAN PRES
	Name of Recipient:	FELDMAN INSURANCE AGENCY
	Delivery Address:	236 N SUNSET AVENUE RM 101
	Post Office, State, Zip:	LOS ANGELES CA 90012

Post Office, State, and Zip Code Line: The post office (city), state, and ZIP code should appear, in that order, as the bottom line of the address.

If all three elements cannot fit on one line, the ZIP Code may be placed on the line immediately **below** the post office and state, aligned with the left edge of the address block. The standard two-letter state abbreviation (see Appendix A) should also be used.

Delivery Address Line: The line immediately above the bottom line is the Delivery Address Line. The street address (or where not available the post office box number, rural route number and box number, or highway contract number and box number) should appear on this line. Mail addressed to the occupants of multi-unit buildings should include the apartment, suite, or room number (or other unit designation) immediately after the street address. When use of a building name is necessary, it should also be placed on the line

immediately **above** . See Appendix B for a description of the Delivery Address Line component elements as well as Appendix A for standard abbreviations.

When addressing mail to a rural route, highway contract route, or post office box, print the information as shown in the following examples:

Rural Route:	RR 3 BOX 10
Highway Contract Route:	HC 2 BOX 10
Post Office Box:	PO BOX 184

While dual delivery addressing is generally not recommended, if used, one delivery designation should be placed on the Delivery Address Line and the other on the line immediately **above** . The mail will be delivered to the address on the Delivery Address Line.

GRAND PRODUCTS INC.
100 MAJOR ST
PO BOX 200
NEW YORK NY 10001-0200

Name of Recipient Line: the name of the intended recipient (business or individual) should appear on the line above the Delivery Address Line. This should be the third, fourth, or fifth line from the bottom, depending on possible overflow from the Delivery Address Line because of dual addressing or other extra wording.

Information/Attention Line: The line above the Name of Recipient Line is optional for additional address information. It can be used to direct mail to a specific person or provide other information that will facilitate delivery such as a department within a company.

Nonaddress Data Line: any nonaddress data (e.g. account number, presort code, etc.) should appear on the line above the Name of Recipient Line or the Information/Attention Line, whichever is higher.

Special Addresses:

Military Addresses: A new format for Army and Air Force post office (APO) and fleet post office (FPO) addresses was introduced in December 1991. APO or FPO is now the equivalent of a city name. AE, AP, and AA are the equivalents of state abbreviations. "AE" (ZIP Codes 090-098) designates Armed Forces in Europe, the Middle East, and Africa. "AP" (ZIP Codes 962-966) designates Armed Forces in the Pacific. "AA" (ZIP Code 34) designates Armed Forces in Central America and South America. For example:

MAJOR JOHN THOMAS	PFC SUSAN SMITH	PCI DAVID JONES
7024 AIRPS	COMPANY A, 122 SIG BN	X-1 DIV/ADMIN
PSC 1 BOX 2051	UNIT 20511 BOX 4290	USS RANGER 9CVA-61)
APO AE 09021	APO AA 34049	FPO AP 96633-2730

Foreign addresses: Mail addressed to foreign countries should include the country name in capital letters (no abbreviations) as the only information on the bottom line. For example:

MR. THOMAS CLARK
117 RUSSELL DRIVE
LONDON, W1P7HQ
ENGLAND

EXCEPTION: Mail addressed to Canada may use either of the following formats when the postal delivery zone is included in the address:

MRS. HELEN K. SAUNDERS
1010 CLEAR STREET
Ottawa, ONTARIO K1A OB1
CANADA

MRS. HELEN K. SAUNDERS
1010 CLEAR STREET
OTTAWA, ONTARIO CANADA
K1A OB1

Points to Remember:

- Single-space the address block. Put at least one, but not more than five full spaces between any character group.
- Left justify the address.
- Abbreviate the state and spell city names in their entirety.
- Uppercase letters are preferred.
- With the exception of the hyphen in the ZIP+4 code, all punctuation may be omitted.
- Rule of Thumb: The entire space on or below the delivery address line of the destination address block should be clear of printing other than the address itself. This minimizes any interference with reading of the address by optical character readers.
- If you use window envelopes, make sure the address is the only thing visible through the window. Inserts and envelopes must be matched so the entire address will show through the window no matter how much the insert slides around. There should be at least 1/4 inch between the address and the left, right, top and bottom edges of the window, whatever the position of the insert.

APPENDIX A - Standard Address Abbreviations

Two-Letter State & Possession Abbreviations	
Alabama	AL
Alaska	AK
Arizona	AZ
Arkansas	AR
American Samoa	AS
California	CA
Colorado	CO
Connecticut	CT
Delaware	DE
District of Columbia	DC
Fed. States of Micronesia	FM
Florida	FL
Georgia	GA
Guam	GU
Hawaii	HI
Idaho	ID
Illinois	IL
Indiana	IN
Iowa	IA
Kansas	KS
Kentucky	KY
Louisiana	LA
Maine	ME
Marshall Islands	MH
Maryland	MD
Massachusetts	MA
Michigan	MI
Minnesota	MN
Mississippi	MS
Missouri	MO
Montana	MT
Nebraska	NE
Nevada	NV

New Hampshire	NH
New Jersey	NJ
New Mexico	NM
New York	NY
North Carolina	NC
North Dakota	ND
Northern Mariana Islands	MP
Ohio	OH
Oklahoma	OK
Oregon	OR
Palau	PW
Pennsylvania	PA
Puerto Rico	PR
Rhode Island	RI
South Carolina	SC
South Dakota	SD
Tennessee	TN
Texas	TX
Utah	UT
Vermont	VT
Virginia	VA
Virgin Islands	VI
Washington	WA
West Virginia	WV
Wisconsin	WI
Wyoming	WY
Directional Abbreviations	
North	N
East	E
South	S
West	W
Northeast	NE
Southeast	SE
Southwest	SW

Northwest	NW
Secondary Address Unit indicators	
Apartment	APT
Building	BLDG
Floor	FL
Suite	STE
Room	RM
Department	DEPT
Street Designator (Street Suffix) Abbreviations	
Alley	ALY
Annex	ANX
Arcade	ARC
Avenue	AVE
Bayou	BYU
Beach	BCH
Bend	BND
Bluff	BLF
Bottom	BTM
Boulevard	BLVD
Branch	BR
Bridge	BRG
Brook	BRK
Burg	BG
Bypass	BYP
Camp	CP
Canyon	CYN
Cape	CPE
Causeway	CSWY
Center	CTR
Circle	CIR
Cliffs	CLFS
Club	CLB
Corner	COR

Corners	CORS
Course	CRSE
Court	CT
Courts	CTS
Cove	CV
Creek	CRK
Crescent	CRES
Crossing	XING
Dale	DL
Dam	DM
Divide	DV
Drive	DR
Estates	EST
Expressway	EXPY
Extension	EXT
Fall	FALL
Falls	FLS
Ferry	FRY
Field	FLD
Fields	FLDS
Flats	FLT
Ford	FRD
Forest	FRST
Forge	FRG
Fork	FRK
Forks	FRKS
Fort	FT
Freeway	FWY
Gardens	GDNS
Gateway	GTWY
Glen	GLN
Green	GRN
Grove	GRV
Harbor	HBR
Haven	HVN

Heights	HTS
Highway	HWY
Hill	HL
Hills	HLS
Hollow	HOLW
Inlet	INLT
Island	IS
Islands	ISS
Isle	ISLE
Junction	JCT
Key	KY
Knolls	KNLS
Lake	LK
Lakes	LKS
Landing	LNDG
Lane	LN
Light	LGT
Loaf	LF
Locks	LCKS
Lodge	LDG
Loop	LOOP
Mall	MALL
Manor	MNR
Meadows	MDWS
Mill	ML
Mills	MLS
Mission	MSN
Mount	MT
Mountain	MTN
Neck	NCK
Orchard	ORCH
Oval	OVAL
Park	PARK
Parkway	PKY
Pass	PASS

Path	PATH
Pike	PIKE
Pines	PINES
Place	PL
Plain	PLN
Plains	PLNS
Plaza	PLZ
Point	PT
Port	PRT
Prairie	PR
Radial	RADL
Ranch	RNCH
Rapids	RPDS
Rest	RST
Ridge	RDG
River	RIV
Road	RD
Row	ROW
Run	RUN
Shoal	SHL
Shoals	SHLS
Shore	SHR
Shores	SHRS
Spring	SPG
Springs	SPGS
Spur	SPUR
Square	SQ
Station	STA
Stravenue	STRA
Stream	STRM
Street	ST
Summit	SMT
Terrace	TER
Trace	TRCE
Track	TRAK

Trail	TRL
Trailer	TRLR
Tunnel	TUNL
Turnpike	TPKE
Union	UN
Valley	VLY
Viaduct	VIA
View	VW
Village	VLG
Ville	VL
Vista	VIS
Walk	WALK
Way	WAY
Wells	WLS

APPENDIX B - Delivery Address Line

Publication 28, Postal Addressing Standards (January 1992)

1. Components.

The delivery address line, as matched against the ZIP+4 File, must be broken down into its individual components on the mailpiece with one space between address elements.

These components are; the primary address number, predirectional, street name, suffix, postdirectional, secondary address identifier, and secondary address range.

The Postal Service uses the parsing logic below to enter address information into the files. When parsing the delivery address line into the individual components, start from the right-most element of the address and work toward the left. Place each element in the appropriate field until all address components are isolated. This process facilitates matching files with AIS products and produces the correct format for output to a mailpiece.

Note: Mailers may use any parsing logic to achieve the same result.

Examples:

101 MAIN ST
101 MAIN ST APT 12
101 W MAIN ST APT 12
101 W MAIN ST E APT 12

2. Street Name.

Information found in the primary name field of the ZIP+4 File is used as the street name. The ZIP+4 file indicates the "preferred" primary street name to ensure that the correctly designated primary street record will be matched during the address standardization processes.

Punctuation is normally limited to periods, slashes, and hyphens:

* Periods: 39.2RD

* Slashes (fractional addresses): 101 ½ MAIN ST

* Hyphens (hyphenated addresses): 289-01 MONTGOMERY AVE

(Hyphens in the address range are significant and are not removed. Hyphens in the street or city name, however, normally are not significant and may be replaced with a space.)

Example:

MID-ISLAND PLZ *becomes*
MID ISLAND PLZ

3. Directionals.

This is a term the Postal Service uses to refer to the part of the address that gives directional information for delivery.

a. Abbreviations.

Abbreviate directionals (if they are one of the eight standard directionals listed in AIS files) to the appropriate one or two character abbreviation.

Examples:

234 NW SMITH ST
678 MAIN DR S
101 N BAY DR
599 BAY BLVD SW

b. Single Directionals.

(1) *Predirectional Field.*

When parsing the address from right to left, if a directional word is found as the first word in the street name and there is no other directional to the left of it, abbreviate it, and locate it in the predirectional field of the ZIP+4 File for standardization purposes.

Examples:

NORTH BAY ST *becomes*
N BAY ST

EAST END AVE *becomes*
E END AVE

(2) *Postdirectional Field.*

When parsing from right to left, if a directional word is located to the right of the street name and suffix, abbreviate it and locate it in the postdirectional field.

Example:

BAY DRIVE WEST *becomes*
BAY DR W

c. Two Directionals.

When two directional words appear consecutively as one or two words, before the street name or following the street name or suffix, then the two words become either the PRE or the POST directionals. Exceptions are any combinations of NORTH-SOUTH or EAST-WEST as consecutive words. In these cases the second directional becomes part of the primary name and is spelled out completely in the primary name field.

Examples:

NORTH EAST MAIN ST *becomes*
NE MAIN ST

BAY AVE SOUTHWEST *becomes*
BAY AVE SW

NORTH SOUTH OAK ST *becomes*
N SOUTH OAK ST

MAPLE CT EAST WEST *becomes*
MAPLE COURT EAST W

The other exception is when the local address information unit has determined that one of the directional letters is used as an alphabet indicator and not as a directional.

Example:

County road N East *becomes* County Road N E
not County Rd NE

Note: In this example, the two word directional is the primary street name.

SOUTHEAST FREEWAY NORTH *becomes*
SOUTHEAST FWY N

d. Directional as Part of Street Name.

When parsing from right to left, if the directional word appears between the street name and the suffix then it appears as part of the primary name spelled out in the ZIP+4 File and will be spelled out on the mailpiece. The exception is when the local Address Information Systems unit has determined that the letters (E, N, S, or W) are used as alphabet indicators and not as directionals.

Examples:

BAY W DRIVE *becomes*
BAY WEST DR

NORTH AVENUE *becomes*

NORTH AVE

Bay A Dr

Bay B Dr

Bay C Dr

Bay E Dr

4. Suffixes.

a. Abbreviations

The suffix of the address should conform with the standard suffix abbreviations listed in the ZIP+4 File (see Appendix C).

b. Two Suffixes.

If an address has two consecutive words that appear on the suffix table (pages 57-63), abbreviate the second of the two words according to the suffix table and place it in the suffix field. The first of the two words is part of the primary name. Spell it out on the mailpiece in its entirety after the street name.

Examples:

789 MAIN AVENUE DRIVE *becomes*

789 MAIN AVENUE DR

4513 3RD STREET CIRCLE WEST *becomes*

4513 3RD STREET CIR W

1000 AVE E *becomes*

1000 AVENUE E

5. Numeric Street Names.

Numeric street names, for example, 7TH ST, or SEVENTH ST should be output on the mailpiece exactly as they appear in the ZIP+4 File.

Spell out numeric street names only when there are duplicate street names within a postal delivery area, and the only distinguishing factor is that one is spelled out.

6. Corner Addresses.

Corner addresses will be replaced by physical street addresses in all AIS files.

Example:

5th and HIGH *becomes*
514 HIGH ST

7. Highways.

The following are recommended standardized examples of county, state, and local highways. (See Appendix F, page 73 for an expanded table).

<u>Address</u>	<u>Name</u>
101	COUNTY ROAD 20
11216	COUNTY HIGHWAY 140
1501	HIGHWAY 50
220	INTERSTATE 680
22604	ROAD 123
1650	STATE HIGHWAY 335
7777	STATE ROUTE 39
1155	US HIGHWAY 70
3000	TOWNSHIP ROAD 20

ATTACHMENT II

STATE AND COUNTY CODES UPS AND FIPS CODES

STATES	USPS CODE	FIPS CODE
Alabama	AL	01
Alaska	AK	02
Arizona	AZ	04
Arkansas	AR	05
California	CA	06
Colorado	CO	08
Connecticut	CT	09
Delaware	DE	10
District of Columbia	DC	11
Florida	FL	12
Georgia	GA	13
Hawaii	HI	15
Idaho	ID	16
Illinois	IL	17
Indiana	IN	18
Iowa	IA	19
Kansas	KS	20
Kentucky	KY	21
Louisiana	LA	22
Maine	ME	23
Maryland	MD	24
Massachusetts	MA	25
Michigan	MI	26
Minnesota	MN	27
Mississippi	MS	28
Missouri	MO	29
Montana	MT	30
Nebraska	NE	31
Nevada	NV	32
New Hampshire	NH	33
New Jersey	NJ	34
New Mexico	NM	35
New York	NY	36
North Carolina	NC	37
North Dakota	ND	38
Ohio	OH	39
Oklahoma	OK	40

Oregon	OR	41
Pennsylvania	PA	42
Rhode Island	RI	44
South Carolina	SC	45
South Dakota	SD	46
Tennessee	TN	47
Texas	TX	48
Utah	UT	49
Vermont	VY	50
Virginia	VA	51
Washington	WA	53
West Virginia	WV	54
Wisconsin	WI	55
Wyoming	WY	56

MARYLAND COUNTIES FIPS
CODE

Allegany	001
Anne Arundel	003
Baltimore	005
Calvert	009
Caroline	011
Carroll	013
Cecil	015
Charles	017
Dorchester	019
Frederick	021
Garrett	023
Harford	025
Howard	027
Kent	029
Montgomery	031
Prince George's	033
Queen Anne's	035
St. Mary's	037
Somerset	039
Talbot	041
Washington	043
Wicomico	045
Worcester	047
Baltimore City	510

ATTACHMENT III

Recommended Guidelines for Standardization of Database File Address Information Prior to Address Matching

A. Recommended Format

Preferred: Create Input data file in DBF Format

Alternative: ASCII data file character fields in quotes, with fields separated by commas

B. Address Information for Geocoding

Valid addresses have the following ordered components ⁶ :

Street Address Segment:	Example:	Recommended Field Width and Type:
Street Number	e.g. 101, 10908	7(N)
Prefix Directional	N,S,E,W,NE,SE,SW,NW	2(AN)
Street Name	One or more words	30(AN)
Street Type	e.g. AVE, RD, ST, LN	5(AN)
Suffix Directional	N,S,E,W,NE,SE,SW,NW	2(AN)
Room/Apartment/Suite ⁷	e.g. RM 1101, DEPT 10A	10(AN)
City (Post Office)	e.g. Annapolis, Baltimore	25(AN)
State	e.g. MD, DE, PA, VA, WV	2(AN)
Zip (+4)	e.g. 21201-2365	5+4(N)

If the county (Maryland's 23 counties and Baltimore City) is separately identifiable in the database record, it should be included in the input data (alternatively separate input data files can be created for each county).

C. Recommended Address Data Normalization Procedure

1. Process input data file in DBF format
2. Convert ASCII data file into DBF format
3. Remove and write to a separate file
 - all blank addresses
 - all post office box addresses
 - all apartment numbers without street addresses
 - all number only addresses
 - all box and street rural addresses
4. Copy original Street Address information into a new field
5. Using the copied Street Address field:

Separate each Street Address into the following additional fields:

Street Number
Prefix Directional
Street Name
Street Type
Suffix Directional
Room/Apartment/Suite

6. Separate Street Name field into several parts using string search for spaces

7. Examine Street Name field:

Check for multi-word Street names
Check for street intersection references

**Sort by Street Name, Street Type, Prefix Dir., Suffix Dir., Street Number

8. Recombine Street Address fields into one field

9. Change MCNAME to MC NAME format

10. Write out file of all fields for address matching:

DBF format
Street Address Field
City Field
State Field
Zip Field
County Field (where available or use separate files for each county)

ASCII format
Field order, separation and padding determined by address matching software

D. Recommended File Naming Conventions

1. The original database file (or a subset of this file with the address information and unique record identifier) is copied and converted to a DBF format if in ASCII format.
2. The copied/converted file will be renamed using the first 5 letters of the original file name.
3. The DBF file of non-matchable addresses will be named using the same 5 letters + NOM (not matchable).
4. The DBF file used for subsequent processing will be named using the same 5 letters + INT (for interim).

5. The DBF file of processed final records will be named using the same 5 letters + FIN (for final).
6. The processed file will contain all original address along with the improved street address field for each record.

ATTACHMENT IV

MDlandbase License Agreement

Obtain a current copy of the License Agreement for MDlandbase from the Office of Planning. This license agreement is intended for use by state agencies.

Footnotes

¹ Commercial software packages are available to assist in correcting mailing addresses in your database to comply with Postal Service approved addresses. Examples include FINALIST (used by Bell Atlantic) and Group 1 Software (used by the Comptroller of the Treasury). An example of an inexpensive CD-ROM product is ZP4 by Semaphore Corp.

² User defined geographic area codes can also be assigned. Examples would include police or voting precincts, legislative districts, service or sales, emergency response service areas, school districts, etc.

³ While prominent organization or business names without a street address are not acceptable for geocoding, most address matching software will allow you to create customized tables to geocode such addresses.

⁴ For a detailed description of the U.S. Postal Service addressing standards see Attachment I.

⁵ For recommended codes see Attachment II.

⁶ The following types of Street Address segments cannot be geocoded using address matching software.

Blank Street Address Segment

Post Office Box

Rural Route

Highway Contract Route

Room/apartment/Suite without Street Address Segment

Organization name without Street Address Segment*

*Note: Most address matching software will allow creation of customized tables to geocode the location of prominent organizations (e.g. Towson State University) or businesses (e.g. Bethlehem Steel).

⁷ Not required for address matching or geocoding.