



# **The U.S. Department of Housing and Urban Development Geospatial Strategic Plan 2022–2025**

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## Executive Summary

Individuals, their communities, and the natural environments they inhabit are all, without exception, located somewhere. That said, the near entirety of the U.S. Department of Housing and Urban Development's (HUD's) charge to *"create strong, sustainable, inclusive communities and quality affordable homes for all"* is geographic in nature. Examining and understanding the dynamic spatial relationships that shape individuals, their communities, and the natural environment therefore remains vital to developing and implementing effective housing policy. Recognizing the outsized influence of geography in housing and community issues, HUD has devoted substantial resources toward developing an enterprise geographic information solution (eGIS) and cultivating a team of professionals to oversee and employ that resource.

This document outlines the Department's vision and agenda for effectively managing the geospatial data, technology, and services critical to HUD's stated mission while aligning with statutes and guidelines of the Geospatial Data Act of 2018 (GDA), the Foundations for Evidence Based Policy Act of 2018 (Evidence Act), Open Government Data Act, the Federal Geospatial Coordinating Committee (FGDC), and the strategic goals of the Department. Key to this plan, the following goals offer tangible steps for ensuring access to, and continual innovation of, HUD's geospatial resources:

1. Codify best practices within the Department for geospatial resource management and data governance.
2. Continue to develop HUD's enterprise geospatial resources to guarantee innovative analysis and business solutions that support the stated mission of the Department.
3. Promote HUD's role as an authoritative source of geospatial information and services throughout the Federal geospatial community and the public at large.
4. Cultivate HUD's geospatial user community through training, outreach, and interdepartmental collaboration.

HUD's ongoing investment in its geospatial solution demonstrates a commitment to developing location intelligence as an asset that is both integral to the business of the Department and critical to the ongoing pursuit of its stated mission.

## Background

### Overview

Although traditionally associated with cartographic production, geospatial technology, data, and analysis techniques provide keen insights into the issues affecting housing, communities, and the long-term life outcomes of individuals. Decisionmakers at all levels of the Department rely on the critical examination of geospatial data for the effective development and application of data-driven housing policies. The Geospatial Data Act of 2018 (GDA) defines geospatial data as *“information that is tied to a location on the Earth, including by identifying the geographic location and characteristics of natural or constructed features and boundaries on the Earth, and that is generally represented in vector datasets by points, lines, polygons, or other complex geographic features or phenomena”*, which *“may be derived from, among other things, remote sensing, mapping, and surveying technologies,”* and *“includes images and raster datasets, aerial photographs, and other forms of geospatial data or datasets in digitized or non-digitized form.”*<sup>1</sup> HUD’s enterprise geographic information system satisfies the common requirement for geospatial data and analytical capabilities in support of the Department’s mission and strategic objectives. When brought to bear, these data and tools allow HUD personnel to develop and apply actionable intelligence in the form of effective housing policies that are data-driven and equitable in scope.

### Solutions Management

Management of HUD’s geospatial resource solution entails a coordinated effort to supply Departmental staff and the public with analytical tools and authoritative geospatial data. To that end, HUD’s Office of the Chief Information Officer (OCIO) allocates funding for the ongoing development of geospatial resources as shared enterprise services. HUD’s Office of Policy Development and Research (PD&R) likewise provides executive sponsorship and management for the Department’s geospatial resource investment, which includes responsibility for the steady state operations and maintenance, and ongoing development, modernization, and enhancement of the Department’s Geocode Service Center (GSC), Enterprise Geospatial Platform, and Open Data Storefront.

### Geocode Service Center

An essential component to the business of HUD, the GSC provides standard address validation, point-level geocoding, and serves as the Department’s reference repository of geographic characteristics for the United States and its territories. Geographic attributes within the system are generally classified according to their source and include data such as Census geographies, Federal Information Processing Standards codes for states and counties, Geographic Name Information System codes for places and localities, U.S. Congressional districts, Metropolitan Statistical Areas (“Core Based” Metro & Micro areas, Divisions, etc.), regional Departmental office codes, and a variety of supplementary information. The GSC brings these data to bear for use cases such as evaluating program eligibility, assessing fair market valuation, and determining median household income to name a few. However, validation of address information submitted to the Department’s automated systems remains the primary critical function of the GSC. HUD’s automated systems utilize the GSC’s online interface to perform point-of-entry address validation, address correction, and point level geocoding in an iterative process to apprise source

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<sup>1</sup> *Geospatial Data Act of 2018*. Public Law 115-254, H.R. 302, Subtitle F, Sections 752.  
<https://www.congress.gov/115/bills/hr302/BILLS-115hr302enr.pdf>.

systems of address accuracy and to suggest alternatives for the input address under various circumstances.

## Enterprise Platform

The Department's Enterprise Geospatial Platform functions as the primary source for geospatial data, services, applications, and metadata. Designed using a Service Oriented Architecture (SOA), the mature system employs a suite of commercial off-the-shelf (COTS) hardware and software products to serve as a repository for geospatial and ancillary datasets used by users and applications alike. The platform's SOA also enables the publication of discrete business functions such as geospatial data, maps, and geoprocessing services across the organization, which are likewise leveraged by enterprise applications hosted in the production environment of the platform.

## Open Data

Leveraging a subscription for COTS Software as a Service (SaaS), HUD's eGIS Open Data Storefront satisfies Federal mandates<sup>2</sup> for the delivery of authoritative geospatial data and services to the public. Responding to this requirement, PD&R staff manage and supply an ever-expanding catalog of interactive maps, applications, and geospatial services to the Department's Open Data solution. An application program interface and RESTful services offer a direct machine-readable interface to site content, and users can likewise access and download authoritative geospatial data in a variety of machine-readable formats including file geodatabases, shapefiles, Keyhole Markup Language files, and Comma Separated Value tables.

Working with the FGDC, HUD has classified 13 authoritative geospatial feature services from its Open Data catalog as National Geospatial Data Assets (NGDA). Given their inclusion in the NGDA inventory, HUD denotes metadata for these 13 feature services in the Department's Enterprise Data Inventory (HUD OCIO, 2022a); a machine-readable JavaScript Object Notation file leveraged by sites like data.gov<sup>3</sup> and GeoPlatform<sup>4</sup> to assist users with the discovery of critical geospatial data.

## Opportunities For Improvement

### Program Management

The coordinated approach with which HUD manages its enterprise geospatial solution has proven effective despite the absence within the Department of a formal geospatial program, Senior Agency Official for Geospatial Information, or Geospatial Information Officer. However, without a program or positions denoting explicit responsibility for the Department's geospatial resources, transparency and accountability for that resource remain potential shortcomings of an otherwise successful and effective management strategy. HUD may wish to leverage mandates introduced with the passage of the Foundations for Evidence-Based Policy Act of 2018<sup>5</sup>, specifically the requirement to establish a position within the Department for a Chief Data Officer, to consolidate and enhance management of the Department's geospatial resources within a designated program office. For example, specifying a formal Location Intelligence Program within the newly established Office of the Chief Data Officer would

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<sup>2</sup> H.R.1770 - 115th Congress (2017-2018): *OPEN Government Data Act*. <https://www.congress.gov/bill/115th-congress/house-bill/1770/text>.

<sup>3</sup> <https://www.data.gov>.

<sup>4</sup> <https://www.geoplatform.gov/>.

<sup>5</sup> H.R.4174 - 115th Congress (2017-2018): *Foundations for Evidence-Based Policymaking Act of 2018*. <https://www.congress.gov/bill/115th-congress/house-bill/4174>.

improve accountability for both management of the Department’s enterprise geospatial solution and governance of its geospatial data assets.

### GSC Modernization

Although invaluable to the Department’s work, the performance of HUD’s existing geocoding services solution remains wanting. A 2020 internal assessment of the GSC revealed a geocode service solution that no longer aligns with current industry standards for system architecture, resulting in diminished performance of the automated business processes that interface with that system. Departmental stakeholders agree on the need to replace the current geocode service solution with one designed using a cloud-based SOA utilizing a scalable distributed SaaS infrastructure for geocoding and data enrichment. To that end, HUD stakeholders have made considerable progress in planning for modernization of the GSC. However, funding constraints have prevented implementation of the enhanced solution, and the initiative likewise failed to receive a commitment for funding in the Department’s 2022 budget (HUD OCIO, 2022b). The Department would therefore be well served by looking to 2023 to secure approval and funding for GSC system modernization while continuing to coordinate with OCIO to push the project forward.

### Enterprise Platform Modernization

Consistent with the Department’s Data Center Optimization Initiative Strategic Plan (HUD, 2021), HUD anticipates migration of its existing enterprise geospatial platform from an on-premises, server-based deployment to a cloud-based target architecture. In addition to projected cost savings, the Department’s strategy for cloud migration presents an opportunity for expanding the footprint of the current platform to extend access and capabilities, promote system integration, and drive new business processes. Successful migration and expansion of the platform requires coordination with both OCIO and HUD’s Office of the Chief Procurement Officer to secure necessary approval and funding for these initiatives. Although PD&R submitted business proposals for both projects, neither received funding in the 2022 Presidential Budget request for the Information Technology Fund. PD&R should continue coordinating with OCIO to secure approval and funding for both projects in FY 2023.

### Metadata Standards

A key tool in the Department’s efforts to democratize geospatial data and services, HUD’s Geospatial Open Data Storefront strives to align with the standards outlined in the GDA. However, efforts to provide machine-readable metadata according to the FGDC endorsed standards for INCITS/ISO 19115-1:2014 (FGDC, 2016) remain ongoing. Currently, a downloadable data dictionary accompanies each hosted feature service for authoritative geospatial data provided through the Open Data Storefront. HUD will prioritize the conversion of ancillary feature service data dictionaries to align with FGDC metadata standards.

## Vision & Guiding Principles

### Vision Statement

A location intelligence program that encourages innovative research, supports data-driven policy development, and promotes data literacy through the democratization of geospatial products and services in support of the Department of Housing and Urban Development’s mission to *“create strong, sustainable, inclusive communities and quality affordable homes for all.”*



## Guiding Principles

- Provide strategic direction, develop processes and procedures for identifying and prioritizing future projects, advise on investment decisions, and establish standards and mechanisms for enforcement of geospatial data governance.
- Provide and maintain a shared infrastructure for the data, services and applications comprising the enterprise geospatial platform, Geocoding Service Center, and Open Data services.
- Maintain a streamlined process for the procurement of contract services to support the operations, development, and enhancement of geospatial solutions.
- Support geospatial training and outreach activities to educate and advocate for geospatial and geographic information systems technology adoption across the Department.
- Support mission delivery and improved productivity through the use of innovative technology, enhanced access to information, and the development of robust analytical capabilities.
- Integrate geospatial with enterprise data and business intelligence systems.
- Enable transparency and collaboration across the Department, with partners and the public.

## HUD's Geospatial Strategic Goals and Objectives

Goal 1 – Codify best practices within the Department for geospatial resource management and data governance.

Establish a Location Intelligence Program within HUD's Office of Policy Development and Research.

*Anticipated outcome -*

- Promote transparency and accountability in managing HUD's geospatial resources.

Identify a Senior Agency Official for Geospatial Information.

*Anticipated outcome -*

- Elevate responsibility and decision making for HUD's enterprise geospatial solution.

Formalize partnerships for data stewardship through the Department.

*Anticipated outcome -*

- Ensure timely delivery of authoritative data.

Goal 2 – Continue to develop HUD's enterprise geospatial resources to guarantee innovative analysis and business solutions that support the stated mission of the Department.

Modernize HUD's Geocode Service Center

*Anticipated outcome -*

- Improved performance and expanded access of geocoding and data enrichment services.

Modernize HUD's Enterprise Geospatial Platform

*Anticipated outcome -*

- Expanded access to data, services, and capabilities, and a subsequent development of new business processes.

Enterprise Cloud Migration

*Anticipated outcome -*

- Cost savings and improved system scalability.

Goal 3 – Promote HUD's role as an authoritative source of geospatial information and services throughout the Federal geospatial community and the public at large.

Commit to the use of FGDC endorsed metadata standards for geospatial data.

*Anticipated outcome -*

- Improved discovery, use, and interpretation of HUD's authoritative geospatial data services.

Expand HUD's National Geospatial Data Asset portfolio.

*Anticipated outcome -*

- Enhanced support of shared mission goals and executive initiatives.

Goal 4 – Cultivate HUD’s geospatial user community through training, outreach, and collaboration.

Establish a geospatial center of excellence.

*Anticipated outcome -*

- Ensure strategic and effective management of HUD’s geospatial resources.

Provide geospatial training to Departmental personnel.

*Anticipated outcome -*

- Encourage democratization of HUD’s geospatial resources.

## Appendices

### Appendix A — Acronyms

Acronym	Description
COTS	Commercial Off-The-Shelf
eGIS	Enterprise Geographic Information System
FGDC	Federal Geospatial Coordinating Committee
GDA	Geospatial Data Act
GSC	Geocode Service Center
NGDA	National Geospatial Data Assets
NSDI	National Spatial Data Infrastructure
OCIO	Office of the Chief Information Officer
OMB	Office of Management and Budget
SaaS	Software as a Service

### Appendix B — HUD Strategic Goals and Objectives.

HUD’s Strategic Plan outlines the goals and objectives driving policy decisions in pursuit of the Department’s stated mission to “create strong, sustainable, inclusive communities and quality affordable homes for all.” The following denotes the goals and objectives included in the plan:

- I. Support Underserved Communities
  - A. Advance Housing Justice
  - B. Reduce Homelessness
  - C. Invest in the Success of Communities
  
- II. Ensure Access to and Increase the Production of Affordable Housing
  - A. Increase the Supply of Housing
  - B. Improve Rental Assistance
  
- III. Promote Homeownership
  - A. Advance Sustainable Homeownership
  - B. Create a More Accessible and Inclusive Housing Finance System
  
- IV. Advance Sustainable Communities
  - A. Guide Investment in Climate Resilience
  - B. Strengthen Environmental Justice
  - C. Integrate Healthcare and Housing
  
- V. HUD will strengthen the Department’s internal capacity and efficiency to better ensure delivery of HUD’s mission by:

- A. Supporting and developing HUD staff
- B. Improving acquisition management
- C. Strengthening information technology (IT), cybersecurity, and data management
- D. Providing sound financial and grants management
- E. Institutionalizing the management of customer experience (CX) across HUD services

## Appendix C — Geospatial Data Act of 2018.

The Geospatial Data Act of 2018 (GDA) codifies previous executive directives concerning the development, management, and use of geospatial data and technology, and formalizes Congressional oversight over federal spending for geospatial resources. The following summarizes key sections of GDA:

- Section 753. Federal Geographic Data Committee
  - Mandates the continuation of policies outlined in OMB Circular A-16 designating the Federal Geographic Data Committee (FGDC) as the primary entity for developing, implementing, and reviewing the policies, practices, and standards relating to geospatial data according to the guidelines and requirements issued by OMB.
  - Identifies the Secretary of the Department of the Interior (DOI) and Director of Office of Management and Budget (OMB) as the Chairperson and Vice Chairperson of the committee, respectively.
  - Requires that the FGDC make available the annual summaries and evaluations of covered agency performance to the National Geospatial Advisory Committee (NGAC) and sets additional reporting requirements.
- Section 754. National Geospatial Advisory Committee
  - Formally establishes an NGAC to be administered within the Department of the Interior.
  - Designates the NGAC as the committee responsible for providing advice and recommendations to the chairperson of the FGDC relating to the management of federal and national geospatial programs, the development of the National Spatial Data Infrastructure (NSDI), and other activities relating to the implementation of the subtitle.
  - Requires the NGAC to review and comment on geospatial policy and management issues and ensure that the views of representatives of non-federal interested parties involved in national geospatial activities are conveyed to the FGDC.
- Section 755. National Spatial Data Infrastructure
  - Defines the NSDI as the “the technology, policies, criteria, standards, and employees necessary to promote geospatial data sharing throughout the Federal Government, State, tribal, and local governments, and the private sector (including nonprofit organizations and institutions of higher education).”
  - Established the goals of the NSDI and mandates that FGDC prepare and maintain a strategic plan.
- Section 756. NGDA Data Themes
  - Requires the FGDC to designate for management by federal agencies NGDA data themes, which are primary topics and subjects such as elevation, federal land ownership, vegetation, or marine boundaries, for which the coordinated development, maintenance, and dissemination of geospatial data would benefit the federal government and people of the United States.
- Section 757. Geospatial Data Standards
  - Requires the FGDC to establish standards for each of the NGDA data themes, including rules, conditions, guidelines, and characteristics, and establishes content standards for metadata.
  - Directs that any information that could reasonably be expected to cause damage to the national interest, security, or defense of the nation, including information relating to geospatial

intelligence data activities, as determined in consultation with the Director of National Intelligence be excluded from public disclosure.

- Section 758. GeoPlatform
  - Directs the FGDC to operate an electronic service providing public access to geospatial data and metadata to be known as the GeoPlatform (many refer to this as the geospatial data “clearinghouse”).
  - Requires that the GeoPlatform be made available through the Internet, be accessible through a common interface, include metadata for all geospatial data collected, directly or indirectly, by covered agencies, and include a set of programming instructions and standards that would provide an automated means of accessing geospatial data.
  - Prohibits the GeoPlatform from storing or serving proprietary information or data acquired under a license by the federal government, unless authorized by the data provider.
  
- Section 759. Covered Agency Responsibilities
  - Establishes the responsibilities and reporting requirements for each covered agency under this subtitle.
  - Requires the Inspector General of each covered agency (or the senior ethics official of a covered agency without an Inspector General), to submit to Congress an audit not less than once every 2 years of the collection, production, acquisition, maintenance, distribution, use, and preservation of geospatial data by the covered agency.
  
- Section 759A. Limitation on Use of Federal Funds
  - Prohibits the use of federal funds by a covered agency for the collection, production, acquisition, maintenance, or dissemination of geospatial data that does not comply with applicable standards established under Section 757, as determined by the FGDC.
  - Establishes that prohibition under this section will be effective 5 years from the date on which standards for each NGDA theme are established by the FGDC.
  
- Section 759B. Savings Provision
  - Establishes a savings provision for the subtitle and states that “Nothing in this subtitle shall repeal, amend, or supersede any existing law unless specifically provided in this subtitle.”
  
- Section 759C. Private Sector
  - Authorizes the FGDC and each covered agency to rely on and use the U.S. private sector for the provision of geospatial data and services, to the maximum extent practical.

## References

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