ASEAN AUSTRALIA SMART CITIES TRUST FUND
Asian Development Bank

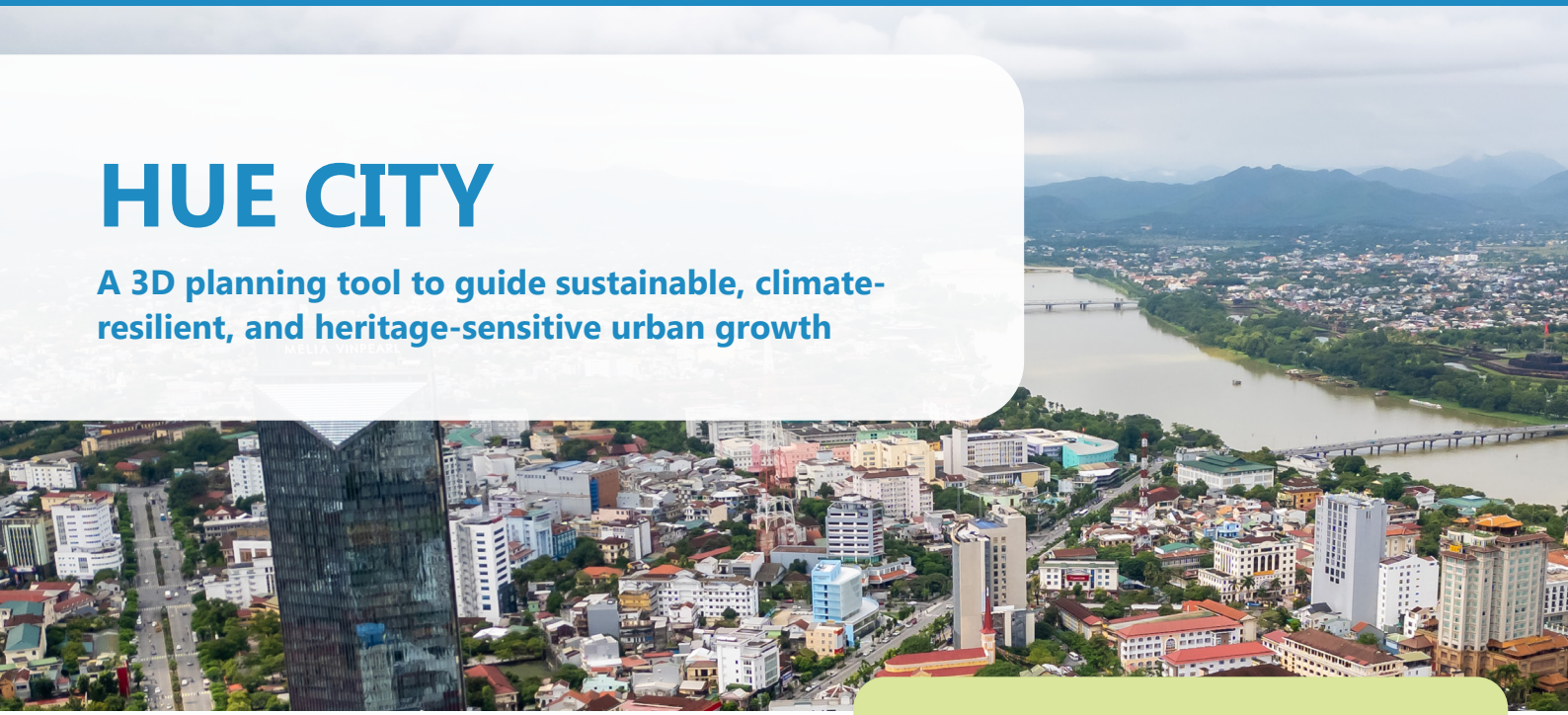
Australian Government
Department of Foreign Affairs and Trade

ADB

PROJECT DATA SHEET | DECEMBER 2025

HUE CITY

A 3D planning tool to guide sustainable, climate-resilient, and heritage-sensitive urban growth



PROJECT SNAPSHOT

PROJECT NAME	Hue Smart Digital City Model for Urban Spatial Planning
COUNTRY	Viet Nam
SECTOR	Urban development
MAIN GOVERNMENT BODY SUPPORTED	Hue City Provincial People's Committee
SMART SOLUTION	The project delivered two key tools: an automated system that turns satellite images into a 3D digital model of Hue for easier city planning, and a single shared database that organizes all of the city's maps and spatial information in one place
PROJECT PERIOD	January 2022 – April 2024
ADB PROJECT OFFICER	Alexander Nash, Urban Development Specialist
MAIN PROJECT OBJECTIVE	To provide Hue City with an updatable data-driven 3D digital model and planning tool by collecting all key location data in a single system, using satellite imagery to map buildings, roads, and open spaces, and training government staff to use these tools for better planning and decision-making.

Hue is Viet Nam's former imperial capital, known for its riverfront landscapes, UNESCO-recognized monuments, and traditional neighborhoods. As the city grows, new challenges are emerging: pressure on land, rising demand for development, and increasing climate risks, especially flooding.

City departments needed clearer tools for planning. They needed a way to visualize how Hue is changing, understand land-use trends, and anticipate risks. Most importantly, they needed a platform that would enable all departments to work from a common evidence base.

The Smart Digital City Model (SDCM) was developed to meet these needs. It gives the city a high-accuracy 3D model paired with a structured spatial database—to guide better planning, improve coordination, and help strengthen the city's climate resilience.

THE CHALLENGE

Planning for Growth and Risk

Hue was managing complex and compounding challenges that existing planning tools could only partly address. Data lived across multiple departments, and information often varied in completeness, making it difficult for teams to form a unified picture of the city. Staff relied on manual reporting processes that took time to compile, limiting their ability to quickly explore different planning scenarios or visualize long-term risks.

At the same time, Hue had important strengths to build on. The city had more than two decades of experience using geographic information systems (GIS), with many departments already maintaining digital datasets and staff familiar with GIS tools. This strong foundation, combined with the province's broader digital transformation agenda, positioned Hue well for a more integrated, scalable planning system.

As development accelerated—new construction around the historic core, rising tourism, and pressure on transport corridors—the need for clearer insights became more visible. The city needed a system that could show how decisions would affect land, people, and heritage in ways that 2D maps and manual workflows could not easily support.

Climate risks added more urgency. Hue faces repeated flooding and the growing impacts of climate change, making it essential to understand vulnerabilities at a granular level. As Mr. Phan Quoc Son explained, the city confronts "many difficulties, such as flooding and climate change," and emphasized that having a detailed model is "very important for the city," especially for identifying which areas require protection and which are suitable for development.

Hue needed a digital system that showed the whole picture: one that was reliable, scalable, and easy for staff to operate, building on the city's existing capabilities while addressing its most pressing planning challenges.

> ***"Hue faces many difficulties such as flooding and climate change, so having this model is very important for the city."***

Phan Quoc Son,
Department of Finance, Hue City

THE SOLUTION

A Digital Model for Better Planning

The Smart Digital City Model provides Hue with an integrated platform for smarter planning.

It provides the city with a complete 3D digital model built from satellite data, drone imagery, and official maps. It covers nearly 350 km², including the historic citadel, riverside communities, district centers, and planned growth zones.

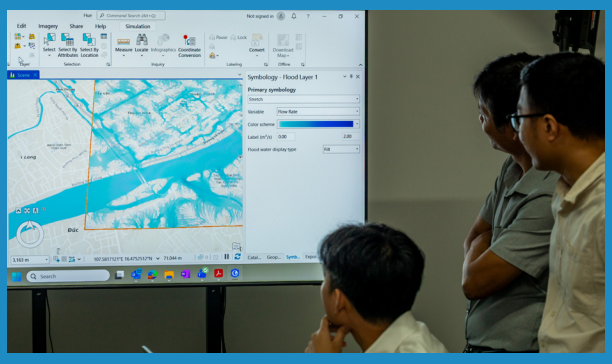
The model combines terrain, 3D building masses, land use layers, infrastructure networks, and environmental data. This allows planners to review development options, check basic compliance with planning rules, and visualize potential impacts in 3D.

The SDCM supports:

- Urban master planning
- Heritage conservation
- Flood and climate risk analysis
- Infrastructure coordination
- Transportation and density studies
- Public engagement through accessible visuals

A s Ms. Pham Thi Kim Phung explained, the model allows Hue “to compare different planning scenarios and see their impacts clearly,” helping departments “make better decisions, especially for investment planning and project screening.”

Officials highlighted the model’s value not only for planning, but for long-term development. As Mr. Nguyen Van Duong shared, the SDCM is “very useful for spatial urban planning, management, and development.”



How the Model Was Built

The project followed a structured and collaborative process.

Data Collection

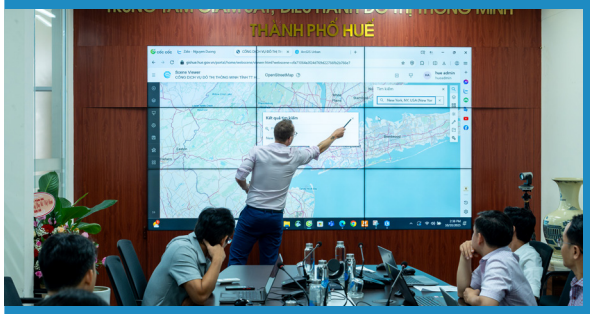
The team assembled all available GIS layers, land-use maps, zoning regulations, flood studies, and heritage constraints. Satellite data was used for large-area coverage because it is fast, cost-effective, and precise.

Model Development

Automated processing tools classified buildings, terrain, and natural features. Objects were created and linked with attributes. The resulting 3D model combines terrain surfaces, building heights, land uses, and infrastructure networks.

Scenario Development

A tool that allows planners and decision-makers to evaluate potential interventions based on cost, complexity, timeframe, private investment attractiveness, and level of benefit per sector, and generates ranked lists of investment options, supporting transparent, evidence-based budgeting.



Capacity Building

Training took place throughout the process. Superusers learned to update datasets, run simulations, and train colleagues. Confidence grew significantly over time. By late 2023, staff were independently exploring how to apply the model to real planning questions.

Sustainment Planning

A sustainment framework was developed to guide updates, strengthen governance, and align the model with city plans and national digital transformation priorities.

Early Results and Emerging Benefits

For the first time, the Smart Digital City Model provides Hue with a unified 3D view of the entire city, covering 350 km^2 of terrain and procedural building masses generated from satellite data and deep learning processes. Installed on the city's secure servers using ArcGIS Enterprise 11.5, the system is stable, integrated, and fully operational, providing departments with a shared platform for visualizing development patterns, testing planning scenarios, and coordinating decisions.

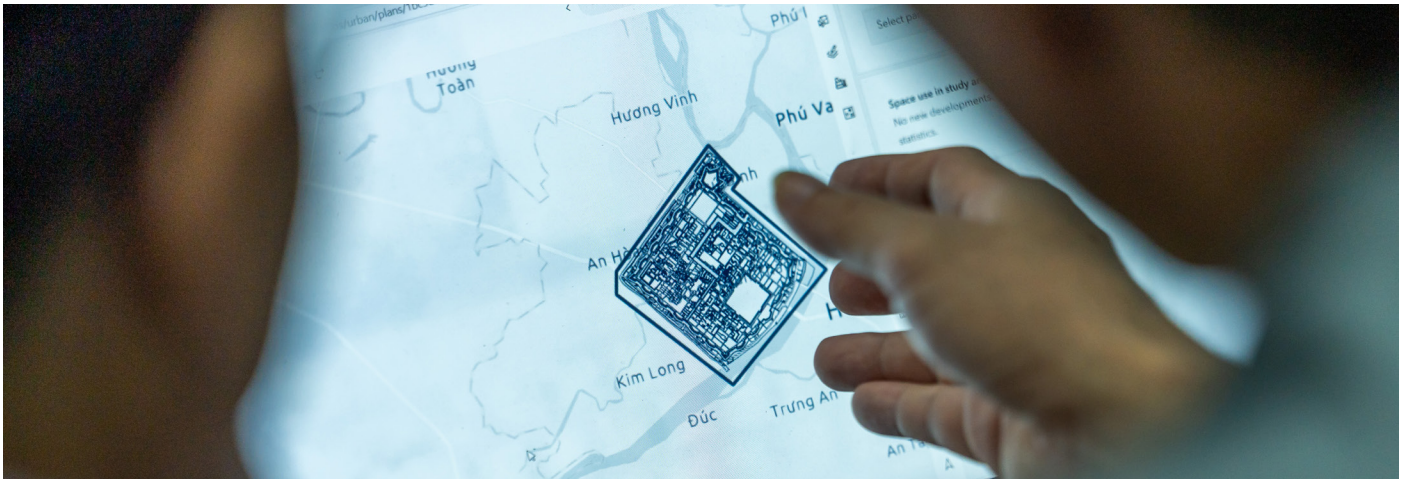
With current datasets, departments have the ability to assess flooding impacts, explore zoning and height compliance, review redevelopment options, and analyze view corridors near heritage sites—key functions demonstrated during training sessions with city superusers. These capabilities can help city staff interpret spatial data more intuitively and understand how different planning choices affect land use, transport networks, and risk areas.

City officials also recognize the SDCM's clear value. As Deputy Director Phan Quoc Son explained, the model will help Hue determine "which areas are suitable for development and which areas need protection," especially as it strengthens its flood management and climate resilience work. The ability to visualize proposals in a real-world 3D context is also expected to improve transparency in reviewing new investments and reduce the time required for interdepartmental coordination.

As departments begin updating the model with new datasets—such as emerging construction, road network adjustments, demographic layers, and climate projections—the SDCM will become even more powerful. The workflows for maintaining and expanding these datasets have already been developed and incorporated into project reporting, allowing Hue to scale the model as its digital capabilities grow.

The system also has the potential to strengthen staff motivation and support talent development. Superusers from multiple departments have begun developing the capacity to update datasets, run analyses, and support peers—an early step toward building long-term local ownership of the platform.

Collaboration opportunities are also emerging around the model. Ongoing efforts include aligning provincial planning databases with the World Bank and exchanging knowledge with a German flood resilience team, both of which are exploring how the SDCM's functions could support upcoming work on climate resilience, flooding, and transport. These engagements point to growing external interest in Hue's digital planning capabilities and the model's potential relevance to future development initiatives.



Why it Matters: Hue Smart Digital City Model Project

- Gives Hue a modern, integrated view of the entire city
- Supports evidence-based urban planning instead of fragmented decisions
- Helps protect heritage and cultural landscapes
- Strengthens climate and flood risk planning
- Improves planning efficiency and reduces duplication
- Makes development review faster and clearer
- Helps staff understand the impacts of planning choices
- Strengthens digital transformation and smart city goals
- Provides a strong example for other cities in Viet Nam and ASEAN

"The Smart Digital City Model is very useful for spatial urban planning, management and development... I hope that in the future, the model can be maintained and improved further so that Hue can become a smart, modern and sustainable city."

Nguyen Van Duong,
Center for Monitoring and Operation of Smart Cities, Hue City

"This model helps us make better decisions, especially for investment planning and project screening."

Pham Thi Kim Phung,
Department of Planning and Investment, Hue City

Supporting Inclusive Planning

City agencies working to address Gender Equality, Disability and Social Inclusion (GEDSI)— including the Hue City Womens' Association and Department of Labor, War Invalids and Social Affairs—were engaged to explore how the SDCM could support more inclusive planning. Discussions focused on identifying and collecting demographic and community profile data to improve how the city allocates services, plans evacuations during floods, and assesses accessibility across neighborhoods. While gaps in disaggregated digital data on groups facing vulnerability and marginalization in Hue were identified, the workflows required to update the model were incorporated into the SCDM reporting. The SDCM provides a platform for integrating future GEDSI datasets, giving the city government a more straightforward way to visualize who benefits from development and who may be left behind.

Superuser training also introduced ideas for improving GEDSI disaggregated data and identifying potential data sources for future integration, laying early groundwork for more inclusive, evidence-based planning as the city continues to advance its digital capabilities.

Lessons and Pivots

The project revealed important lessons.

- Digital systems only work when departments use them regularly. Early involvement helped build ownership and interest. The emergence of superusers was a key shift—they now lead updates, solve issues, and support colleagues.
- Satellite data provided a strong foundation. It offers wide coverage, speed, and affordability, making the approach replicable for other cities.
- Training is essential. Superusers became the backbone of sustainability. Their role in updating, solving issues, and supporting peers is critical.
- Scenario development helped staff understand the model's value. Comparing density options, flood scenarios, and development proposals made planning tangible.
- The experience showed the importance of documentation, clear workflows, and regular mentorship. These ensure that new staff can learn quickly and that data quality remains high.
- These lessons will guide how Hue strengthens digital planning in the future.

Sustaining the Gains

While AASCTF supported the development of a sustainment plan to guide technical updates, strengthen governance, and integrate the model into provincial planning systems, Hue is committed to maintaining and expanding the Smart Digital City Model.

Technical sustainability requires regular updates to building footprints, roads, land-use data, climate layers, and satellite-derived imagery. Superusers and IT staff now have the skills to perform these tasks and maintain data quality.

Institutional sustainability entails embedding the SDCM into the city's official planning processes, digital transformation roadmap, heritage management, and development review procedures. Departments are encouraged to use the model when evaluating investment projects, adjusting zoning, or assessing climate vulnerabilities.

The province is exploring a Smart City Operations Unit to oversee data governance, provide helpdesk support, and coordinate regular model updates. This structure will help maintain continuity across future staff changes.

Inclusivity is part of the plan. Citizen data and socioeconomic indicators will help the city ensure that urban improvements benefit women, persons with disabilities, and underserved communities.

As Mr. Nguyen Van Duong expressed, the city hopes the model "can be maintained and improved further so that Hue can become a smart, modern and sustainable city."

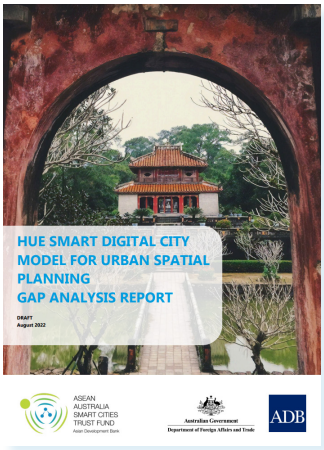
A Ripple Effect for ASEAN Cities

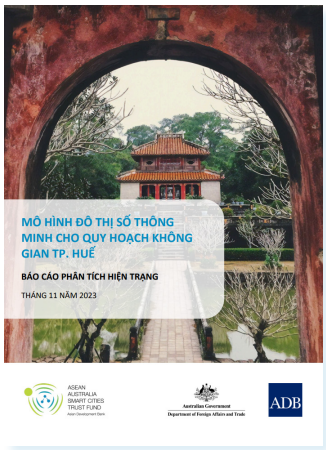
Hue offers a practical example for cities across the region. It shows that a 3D city model can be developed using satellite data, clear workflows, and targeted continuous training—an approach that is more cost-effective and scalable than traditional LiDAR-based methods, while still delivering the functionality needed to support daily work and long-term planning.

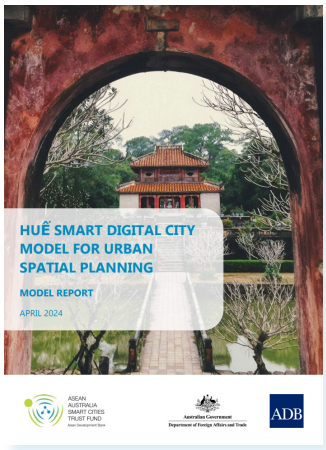
The project also demonstrates the value of scenario-based decision-making. Planners can test ideas before making commitments, reducing risks and improving the quality of investment discussions.

Hue's experience shows how digital tools can be practical and sustainable when they build on existing GIS capabilities, even in places with limited resources. With these tools in place, the city is now better equipped to guide its growth, manage climate risks, and protect its cultural heritage. The Smart Digital City Model strengthens the city's capacity to plan for the future and provides a replicable road map for other cities pursuing smarter, more resilient and livable development.

LEARN MORE







For more information on this project, check the Hue resources in the AASCTF Data Room:

TO UPDATE QR

ABOUT THE ASEAN AUSTRALIA SMART CITIES TRUST FUND

The ASEAN Australia Smart Cities Trust Fund (AASCTF) assists ASEAN cities in enhancing their planning systems, service delivery, and financial management by developing and testing appropriate digital urban solutions and systems. By working with cities, AASCTF facilitates their transformation to become more livable, resilient, and inclusive, while in the process identifying scalable best and next practices to be replicated across cities in Asia and the Pacific. AASCTF is supported by the Australian Government through the Department of Foreign Affairs and Trade, managed by the Asian Development Bank, and implemented by Ramboll.

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