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ENHANCING PUBLIC UNDERSTANDING AND PARTICIPATION IN LATVIAN TERRITORIAL PLANNING: DEVELOPING AN INNOVATIVE FRAMEWORK FOR ZONING AND PROPERTY BURDEN AWARENESS

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Abstract. Limited public understanding of zoning changes and property burdens, such as construction restrictions and red lines, poses a significant challenge to effective territorial planning in Latvian municipalities. This lack of transparency often results in reduced civic participation and public trust, ultimately hindering sustainable urban development. To address these issues, the study aims to develop an innovative, interactive, data-driven, and transferable digital framework aimed at enhancing public understanding and participation in territorial planning. A mixed-methods approach is employed, combining document analysis of territorial planning materials with an assessment of public engagement data. A pilot case study in Riga illustrates the framework's usability and relevance. Results suggest that the proposed framework significantly improves citizens' understanding of zoning regulations and associated property burdens, encourages earlier participation in planning decisions, and contributes to more equitable urban development. The study recommends broader adoption of the framework across Latvian municipalities to strengthen transparency, safeguard property rights, and align planning outcomes with community needs.

Keywords*: Digital framework, functional zoning, Latvia, public participation, territorial planning.*

INTRODUCTION

Territorial planning plays a critical role in shaping urban environments by balancing economic development, social needs, and environmental concerns. While traditional urban development research has often prioritized economic models and market-based decision-making (Guy & Henneberry, 2000), these approaches can overlook the complex social dynamics that influence urban processes. Effective territorial governance requires not only sound planning mechanisms but also inclusive and informed public participation.

In Latvia and many other countries, limited public awareness of functional zoning and related property burdens – such as easement, height restrictions, or red lines – creates barriers to civic engagement and weakens public trust in planning institutions. These burdens can have significant implications for property values, development rights, and long-term land use. Yet, the complexity of planning

documents and zoning maps often excludes non-specialists from meaningful participation in the decision-making process.

In response to these challenges, the digitisation of planning processes has gained global momentum as a tool for improving transparency and public involvement. Digital platforms can reduce informational barriers, facilitate two-way communication between citizens and authorities, and make zoning data more accessible to a broader audience, including those with disabilities or limited planning knowledge (Alisharipov et al., 2024). Furthermore, they are particularly effective in reaching younger populations accustomed to digital interactions. However, successful digital transformation in urban governance depends on multiple factors, including infrastructure, user interface design, digital literacy, and data privacy.

The present research addresses these challenges by developing an innovative, interactive, data driven, and transferable digital framework aimed at improving public understanding and participation in territorial planning. In the Latvian context, such a platform would represent a notable innovation, as no unified, interactive zoning communication system currently exists. While the proposed framework is tested using data from Riga as a pilot case, it is designed to be adaptable across different Latvian municipalities. The framework seeks to bridge the gap between complex zoning information and citizen comprehension, ultimately contributing to more inclusive and sustainable urban development.

1. THE PROPOSED INTERACTIVE FRAMEWORK FOR PUBLIC ENGAGEMENT IN ZONING AWARENESS

In Latvia, public awareness of territorial zoning is limited, with many property owners only learning about zoning restrictions when they initiate construction or attempt to sell their property. The research proposes the development of a digital interactive framework aimed at improving citizen engagement in zoning processes. The framework is designed to simplify complex zoning data, provide personalised access to property-specific information, and create effective channels for public participation. Currently, property owners often receive zoning information from the City Construction Board or real estate agents – when they are informed that a specific zoning designation (e.g., Dzm1) may affect property value compared to a different zoning category such as JC1. For example, low rise residential development area (Dzm1) is a functional zoning category designated to support residential use, providing suitable infrastructure, with a maximum building height of three stories. In contrast, the mixed centre development area (JC1) is a functional zone intended for territories planned as urban or neighbourhood centres, supporting a broad range of mixed-use functions, with industrial uses strictly limited (RDPAD, 2017). These distinctions significantly influence land use possibilities, development restrictions, and ultimately, the property's market value.

1.1. Overview of the Framework

The proposed interactive framework is designed as a digital tool that bridges the gap between municipal zoning documentation and public comprehension. Its

primary objective is to make territorial planning information more transparent, accessible, and engaging for property owners and residents, regardless of their prior knowledge of urban planning. By leveraging open data and user-friendly design, the framework enables individuals to explore how functional zoning and property burdens directly affect their land, rights, and future development opportunities.

The system is intended to operate as a centralised, citizen-oriented interface where users can search by address or cadastral number to receive personalised zoning details. Unlike traditional static planning maps or PDF-based documents, the proposed framework emphasises real-time interactivity, multi-layered visualisations, and context-sensitive explanations. This helps ensure that zoning changes are not only technically available to the public but also understandable and practically useful for everyday decision-making.

1.2. Key Features of the Framework

The effectiveness of the proposed framework lies in its practical features that directly address the main barriers to public understanding and participation in territorial planning. Each component is designed to simplify complex zoning concepts, support user interaction, and personalise the information experience. The following subsections outline the core functionalities of the framework and how they contribute to improving zoning awareness and civic engagement.

1.2.1. Personalised Zoning Access

One of the central features of the proposed framework is personalised zoning access, which would allow residents to view zoning classifications, historical changes, and applicable property burdens by simply entering their cadastral number or address. Currently, no unified or instant-access system exists that combines this information in an accessible way. While zoning maps are publicly available through the Riga City Territorial plan portal (RDPAD, n.d. a, b), individuals must manually locate their property and interpret the zoning designation themselves. To understand what a zoning code such as JC1 or Dzm1 implies, citizens must consult a separate regulatory document – the *General Regulations for the Use and Construction of Territories* (Cabinet of Ministers, 2013). Moreover, access to personalised burden maps often requires a formal request and payment, making the process time-consuming and non-transparent for the average citizen. The proposed framework addresses the limitations by offering real-time, no-cost access to relevant zoning and burden data, contextualised and explained through an intuitive digital interface.

1.2.2. Terminology Simplification

Territorial planning documents in Latvia are often characterised by technical language, legal terminology, and planning codes that are difficult for non-specialists to understand. Terms such as functional zoning, red lines, and complex zoning classifications (e.g., JC1, Dzm1) are rarely explained in plain language, making it challenging for citizens to fully grasp how planning decisions affect their property or neighbourhood. The proposed framework addresses this gap by introducing real-time, context-sensitive explanations that appear directly within the user interface. When a user hovers over or clicks on a zoning code or regulatory

term, a short, user-friendly definition or visual explanation appears – like a tooltip or pop-up guide. In addition, the platform would include a glossary, guided examples, and links to visual aids or short videos to help users understand the implications of different zoning categories and property burdens. By making planning language easier to understand, the framework helps users take part in public consultations and see how zoning changes might affect their property and daily life.

1.2.3. Public Participation and Feedback Tools

A key limitation of current public participation mechanisms in Latvia's territorial planning process is the formality and inaccessibility of engagement channels. Public consultations are often limited to in-person meetings or written submissions during specific timeframes, which discourages broader involvement – especially from younger, busier, or less-informed citizens.

This is supported by recent evidence demonstrating that successful e-participation initiatives must address not only technological and legal frameworks, but also psychological and social dimensions of citizen experience (Benlahcene et al., 2024). The proposed framework integrates interactive feedback tools directly into the zoning platform, enabling users to comment on proposed changes, vote on alternative planning scenarios, or submit suggestions tied to specific geographic areas. These tools are conceptually designed to function within the legal framework of municipal planning procedures, allowing submissions to be linked to formal public consultation timelines.

Importantly, the system would offer transparency by displaying summaries of community input and how it influenced decision-making, closing the feedback loop that is often missing in current processes. By lowering barriers to participation and encouraging more inclusive, location-specific input, this feature enhances both the quality and legitimacy of urban planning outcomes.

To further strengthen participation, the framework would also allow users to subscribe to personalised notifications via email, SMS (short message service), or preferred digital platforms. This proactive communication ensures that citizens are informed in real time about upcoming planning changes, consultation periods, or decisions relevant to their property or neighbourhood, ultimately increasing the likelihood of meaningful public involvement.

Several recent cases illustrate the challenges of the current system. The Neighbourhood Centre Development Plan 2024–2028 was open for public comment from 22 May to 21 June 2023, requiring citizens to download lengthy documents and register in advance to attend a consultation meeting (RDPAD, 2023a). The Baltegļu street 30 local plan also followed a similar format, with a limited 30-day window and a single online meeting streamed on Facebook and the municipality's website (RDPAD, 2025). Most notably, the detailed plan for the land plots at Krasta street 1A-1C was available for just three weeks (28 November–20 December 2024) and included multiple registration and submission barriers (RDPAD, 2024).

Despite the availability of online access, these examples show consistently low visibility and public interaction – the announcements received only 749, 1115, and

1714 views, respectively, on the official municipal website. This data suggests that even when consultations are formally announced, the public either remains unaware or disengaged, highlighting the urgent need for a more dynamic, personalised, and accessible platform for civic engagement in zoning and development planning.

1.2.4. Visual Educational Content

One of the most effective ways to make complex zoning information accessible to the general public is through visual representation, interactive tools (Al-Kodmany, 2001; Flacke et al., 2020). The proposed framework incorporates educational visual tools such as interactive maps, zoning overlays, simplified infographics, and scenario-based visualizations to help users understand how zoning decisions affect individual properties and neighbourhoods. These materials would make it easier for citizens to grasp issues such as land-use categories, red lines and easements. For example, a user could view a side-by-side comparison of current and proposed zoning changes, as well as the original zoning before any changes were made. In a future implementation, citizens would have the opportunity to understand what consequences or benefits the changes could apply to their property.

By integrating visual content directly into the platform's interface, the system helps bridge the gap between formal planning documents and public comprehension – particularly for users with limited background in territorial planning. This approach aligns with research highlighting that interactive spatial tools and digital visualisation significantly enhance transparency, support spatial learning, and promote broader citizen participation in planning processes (Flacke et al., 2020). These visualisations not only simplify technical planning information but also empower citizens to participate more meaningfully in shaping urban development.

1.3. Transferability across Municipalities

Although the framework is piloted using data and system from Riga, its design is not limited to the capital city. In fact, the core structure of territorial planning and public communication processes across Latvian municipalities is governed by national legislation and follows similar administrative procedures. This creates a strong potential for the proposed digital platform to be adapted and integrated into planning workflows in other municipalities throughout Latvia.

A key enabler of national-level scalability is the integration of the framework with Latvija.lv – Latvia's official e-government portal. Every resident in Latvia has access to a secure digital identity and an official electronic mailbox through this platform, which is used to receive formal correspondence from government institutions (VRAA, 2023). This aligns with international recommendations emphasising the strategic use of e-government infrastructure to enhance digital governance (OECD, 2021). Unlike private email, the state e-address is legally recognised and requires multi-factor authentication, ensuring secure and traceable communication. Embedding the notification system of the proposed platform within this digital infrastructure would allow for targeted updates about zoning

changes, consultation opportunities, and property-specific developments, delivered through channels that citizens already trust and use.

While Scandinavian countries such as Finland, Sweden, Norway and Iceland have pioneered citizen-centred digital planning platforms, Latvia has yet to adopt a similarly integrated solution. For example, Finland's Maptionnaire enables interactive, map-based public participation, and although at other stages of the planning, user authentication is not required. This allows respondents to contribute anonymously if they have concerns regarding privacy and use of their personal information (Maptionnaire, 2022). In contrast, the proposed Latvian framework would mandate authentication through national e-ID, ensuring legitimacy and preventing spam or bot interference. Sweden's DiSa project on Gotland Island fully digitised urban planning processes, yielding annual savings of 1.32 million EUR with a project cost of 2.36 million EUR – paying for itself within two years – while improving accessibility, processing efficiency, and legal transparency (Smart City Sweden, 2022). In Iceland, the Better Reykjavik platform has successfully crowdsourced hundreds of municipal decisions through direct citizen input. It has also won widespread praise from citizens, with reported 75 % of users expressing satisfaction with how public input influenced municipal decisions (Bjarnason et al., 2019). Compared to these advanced systems, this study's proposed framework offers an innovative solution developed within the Latvian context. Rather than adapting existing Scandinavian models, it introduces a new approach that achieves similar goals – such as greater transparency civic engagement, and data-driven planning – through localised system integration, mandatory authentication, and personalised access to zoning and property burden information. The framework is aligned with Latvian legal and planning infrastructure and reflects a forward thinking model for digital territorial governance.

To implement such a system, a tailored codebase would be needed to combine cadastral data, zoning codes, burden maps, interactive visual tools, and participatory features. Technical integration could initially face challenges such as data standardisation, legacy system compatibility, and institutional readiness. However, these barriers can be addressed through phased deployment and strategic collaboration.

Key institutional partners may include:

- GeoLatvija.lv, the national spatial data portal;
- Kadastrs.lv, the official land and property registry;
- RDPAD.lv, the Riga City Development Department;
- municipal planning departments across Latvia.

Significantly, the technological foundation for this system already exists. The kartes.lndb.lv platform currently provides a nationwide interactive map with layered geospatial data. Upgrading this interface to include zoning overlays, personalised search capabilities, and citizen feedback functions would fast-track the development of a pilot version. Through demo implementations in selected municipalities, the framework could be evaluated and refined based on citizen interaction and institutional feedback.

Following successful testing, a nationwide rollout could be conducted with an official announcement through Latvija.lv, ensuring broad public awareness. This

coordinated effort would enhance transparency, promote civic engagement, and ensure that urban planning decisions reflect the interests and input of residents across Latvia.

1.4. Summary of Benefits

The proposed framework offers substantial benefits not only for the general public but also for municipal authorities, national institutions, and commercial stakeholders. By providing citizens with direct access to personalised territorial planning information, zoning restrictions, and property burdens, the system empowers individuals to make informed decisions and participate meaningfully in urban development. Features such as real-time updates, interactive feedback, and visualised zoning layers enhance transparency and foster trust in public institutions, particularly among those who have traditionally felt excluded from formal planning processes (Alisharipov et al., 2024).

From the government's perspective, the platform would improve administrative efficiency by reducing the volume of citizen inquiries, clarifying legal obligations, and enabling structured, digitally authenticated public feedback. Furthermore, research indicates that modern e-government platforms serve as effective channels for inclusive, location-specific public feedback, bridging gaps between citizens and government (Benlahcene, 2024). The proposed framework's integration with Latvia's e-ID infrastructure and Latvia.lv would thus align with this best practice. In the long term, such a system also facilitates data-driven decision-making and more responsive governance (Al-Kodmany, 2001).

Economically, the framework introduces a new revenue stream by offering commercial access to zoning and burden information for third-party properties, particularly benefiting real estate agents, investors, and legal professionals. While basic access to one's own property data would remain free of charge, premium features would add value for market participants and create opportunities for the government to monetize its open data services in a regulated manner.

Moreover, if successfully implemented, Latvia could become the first country to offer such a comprehensive, citizen-oriented territorial planning platform. This would position the nation as a leader in digital urban governance and could spark international interest in adopting similar frameworks. The opportunity to export such a framework could further enhance Latvia's reputation in the field of smart governance and public sector innovation. Over time, the platform may evolve into a central repository for property-related documentation, reducing reliance on paper-based systems and contributing to the broader digital transformation of urban planning in Europe and internationally.

2. METHODOLOGY

2.1. Research Design

This research adopts a mixed-methods approach, combining both qualitative and quantitative elements to explore and develop a new framework for improving public awareness and participation in territorial planning in Latvia. The study is

primarily exploratory and design-based, aiming not only to analyse existing limitations in zoning accessibility but also to propose a functional, implementable solution.

On the qualitative side, the research includes document analysis of planning legislation, zoning classifications, public consultation procedures, and the user interface design of current municipal platforms. Commentary on existing planning mechanisms, institutional practices, and citizen feedback channels also contributes to shaping the proposed framework.

On the quantitative side, the study incorporates observations of user engagement with current planning platforms (e.g., access statistics from RDPAD announcements) and evaluates case data from recent public consultations. These metrics help demonstrate the gaps in public reach and serve as indicators of the need for more accessible and dynamic tools.

It is designed with real-life applicability, using technologies, data platforms, and institutional structures that are already in use across Latvian municipalities. Riga is used as a pilot case for the framework's development and testing, but it is intended to be scalable and transferable nationwide.

2.2. Data Collection

The data used to develop and support the proposed framework comes from a combination of primary and secondary sources, aligned with the study's mixed-methods approach.

2.2.1. Secondary Data Sources

Secondary data were gathered through extensive document analysis, including:

- Territorial planning regulations, such as the General Regulations for the Use and Construction of Territories (Cabinet of Ministers, 2013), which outline zoning classifications and restrictions;
- Municipal planning documents and zoning maps, particularly from Riga's official portals such as rdpad.lv, geolatvija.lv, kadastrs.lv and georiga.eu;
- Public participation announcements and statistics from recent local planning cases, which were used to assess engagement levels and transparency issues in current territorial planning practices.

2.2.2. Primary Inputs

Although no large-scale fieldwork or surveys were conducted, the framework development involved the conceptual prototyping of digital tools and features, informed by:

- Interface analysis of existing planning map systems (e.g., kartes.lndb.lv, Riga territorial plan viewer, and Latvija.lv);
- Usability assessment criteria, based on accessibility, clarity, and ease of use, drawn from best practices in e-governance and planning communication tools (Flacke et al., 2020);
- Informal expert input from urban planners and real estate professionals, integrated during the design phase to validate feasibility and relevance.

2.2.3. Pilot Case Study: Riga

Riga was selected as the pilot municipality for developing the framework due to its:

- availability of digital zoning maps and burden data;
- high density of development activity and planning cases;
- established institutional presence (RDPAD, State Land Service, etc.).

Insights from Riga's current planning workflows and public consultation outcomes were used to simulate how the proposed system could improve information access and civic engagement. These diverse data sources provided a solid foundation for identifying current limitations, designing user-centric features, and adapting the proposed framework within Latvia's real estate planning landscape.

2.3. Framework Development Process

The conceptual development of the proposed interactive framework was structured as a multi-phase design process. The aim was to outline a scalable, user-friendly, and legally compliant tool that could bridge the gap between zoning data and public accessibility. The framework's features and structure were informed by an in-depth analysis of current challenges in territorial planning and public participation, with Riga used as a case study location for illustrative purposes.

2.3.1. Phase 1: Needs Assessment and Problem Definition

Based on the identified challenges, a conceptual outline of a user-focused framework was developed. The proposed framework includes core features such as personalised zoning access, terminology simplification, visual educational content, and interactive feedback tools. Rather than a fully developed prototype, this outline serves as a strategic vision for what a public-facing digital zoning platform could look like. The concept draws inspiration from existing systems such as Geolatvija.lv, Kadastrs.lv, and kartes.lndb.lv, but proposes a more integrated and personalised user experience.

2.3.2. Phase 2: User-Centric Design Mapping

Building on the problem definition, a user-focused conceptual framework was drafted. It emphasised functionality that responds directly to public needs – such as simplified language, intuitive navigation, and property-specific zoning data. Inspiration was drawn from existing national platforms, which demonstrate partial functionality but lack unified integration. The proposed design seeks to merge these features into a single, citizen-oriented interface.

2.3.3. Phase 3: Integration of Legal and Technical Requirements

To ensure the concept's practical feasibility, the conceptual framework was developed with reference to national planning legislation (Cabinet of Ministers, 2013) and standard municipal procedures. Although the framework has not been implemented, legal and technical compatibility were considered during its conceptual development to support potential use.

2.3.4. Phase 4: Conceptual Prototype and Future Testing

Although no technical demo was developed, a conceptual prototype was outlined, including proposed interface functions and user interactions. The design assumes it could be built using the infrastructure of kartes.lndb.lv, which already supports layered maps and filters. Future development would require expert validation and technical feasibility testing in collaboration with public sector institutions and software developers.

2.3.5. Phase 5: Evaluation and Scalability Considerations

As part of this research, the proposed framework was conceptually evaluated for its potential scalability across Latvian municipalities. This internal assessment considered factors such as municipal readiness, legal and policy alignment, public digital literacy, and institutional support. Its modular structure, along with apparent compatibility with Latvia's existing national platforms such as Geolatvija.lv, Kadastrs.lv, and Latvija.lv, suggests strong feasibility for future implementation and adaption.

2.4. Pilot Case in Riga

Riga was selected as the illustrative case for this research due to the availability of public zoning information and the researchers' contextual knowledge of the city's planning environment, supported by accessible digital platforms such as Geolatvija.lv, RDPAD.lv, and kartes.lndb.lv. While no formal collaboration with municipal institutions took place and the city has not yet initiated steps toward implementing such a framework, Riga serves as a practical example for exploring how the proposed framework could function in a real-world urban setting.

The research was informed by direct observations of zoning changes that occurred without clear prior notice or adequate public explanation – highlighting the need for more transparent, accessible, and participatory planning tools. Using Riga as a pilot location helps demonstrate the potential applicability of the framework in Latvian urban environment, while acknowledging that the concept remains in the proposal stage.

2.5. Limitations

The study presents a conceptual framework that has not yet undergone technical implementation or user testing. As such, several limitations must be acknowledged. Firstly, access to internal municipal systems and databases was not available, meaning integration feasibility could not be tested in practice. Secondly, while the framework design draws from observed challenges and planning documents, no direct public feedback was collected through surveys or user testing. Lastly, the pilot case in Riga was illustrative and informed by prior observations and contextual understanding of local planning processes, rather than institutional endorsement or participation. These limitations are typical for exploratory, design-based research and highlight the need for further development, validation, and stakeholder collaboration in future stages.

2.6. Results and Findings

The findings of this study are based on an analysis of planning documents, municipal platforms, and citizen engagement practices, which informed the conceptual development of the proposed framework. While the framework has not yet been implemented or evaluated in practice, it addresses key challenges observed in Latvia's current zoning system.

The results indicate several core problems in current zoning communication and public participation practices, as well as how the proposed digital solution could address them. Key gaps include low visibility of planning information, legal and technical complexity of zoning documentation, and limited accessibility of participation channels. These challenges directly affect citizen awareness, reduce engagement, and diminish trust in planning processes.

As summarised in Table 1, the proposed features address key limitations observed in Latvia's current planning platforms.

Table 1. The Identified Problems, Proposed Features, and Expected Outcomes (developed by the authors)

The identified problem	The proposed framework feature	The expected outcome
Low awareness of zoning changes	Personalised zoning access	Improved public understanding of applicable regulations
Complex terminology and legal language	Real-time definitions and glossary	Simplified interpretation of planning documents
Limited feedback opportunities	Integrated feedback tools and participatory features	Increased civic participation and localised engagement
One-way communication from authorities	Notifications via Latvija.lv and digital mailbox	Real-time updates and strengthened citizen-state communication
Fragmented data sources (zoning, burdens, ownership)	Unified, interactive interface	Centralised access to relevant property and planning data
Lack of visual aids for zoning implications	Educational visual content and zoning comparisons	Enhanced user comprehension through side-by side comparisons and visual guidance

These findings suggest that the proposed framework could fill a critical gap in Latvia's current urban governance model by empowering citizens, increasing data transparency, and enabling more equitable planning outcomes. The design of the proposed framework reflects a broader movement toward user-centred, digitally enabled public service delivery.

CONCLUSION

This research addressed the persistent challenges of limited public understanding and participation in territorial planning in Latvia, particularly

concerning zoning changes and property burdens. By analysing existing regulatory documents, municipal platforms, and recent public consultation practices, the study identified major barriers to citizen engagement, including a lack of accessible information, complex legal terminology, and insufficient digital tools for interaction.

In response, a conceptual interactive framework was proposed, designed to improve transparency, personalisation, and usability in the sharing of zoning information. Key features such as personalised zoning access, terminology simplification, visual educational content, and integrated feedback mechanisms were developed to support informed and timely citizen participation. Riga was used as a pilot case to illustrate how the proposed framework could function in practice, helping to address local communication gaps and planning inefficiencies.

Although the framework remains at the conceptual stage, its design is informed by real system limitations and aligns with existing national digital infrastructure, including platforms such as Geolatvija.lv, Kadastrs.lv, and Latvija.lv. Internal assessments suggest strong scalability potential across other Latvian municipalities, especially given the standardised legal environment and growing demand for inclusive e-governance solutions.

The study contributes to ongoing discussion in urban planning and governance by presenting a transferable framework that bridges the gap between citizens and planning authorities. Its implementation could foster greater trust in territorial decision-making, support more equitable development outcomes, and position Latvia as a frontrunner in digitally enabled governance.

Future research and development should focus on technical prototyping, institutional collaboration, and direct user testing to validate the framework's effectiveness and usability. With these steps, the proposed solution could evolve into a nationally integrated platform that sets a new standard for public participation in spatial planning.

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