



European Network for Digital Building Permit

## EUnet4DBP Publication Series



## Comparative study on building permit processes in Europe

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## 1. ABSTRACT

The issuance of building permits is a crucial process for urban development in accordance with the law and sustainability goals. Building permits in Europe involve a complex tapestry of processes, regulations, and methodologies. Despite its critical role in shaping the urban landscape, detailed investigations of building permitting process have been scarce. This gap in knowledge not only hinders the optimization of these processes but also limits the potential for digital transformation, a key step in modernizing administrative functions. The report aims to fill the gap through a comparative analysis of building permitting processes in 19 European countries. By delving into complexities, the objective is to establish a foundation for enhancing process efficiency and fostering a holistic perspective in Europe. This information can contribute to the formulation of more effective policies and inspire providers to develop improved solutions and practices. The adopted methodology involves, in the initial phase, data collection through conducting interviews directly with expert individuals employed in municipalities. The same interview guideline, based on previous studies, was employed to ensure the consistency and quality of the collected data. Following a data preparation phase, the data evaluation consisted in adopting a qualitative analysis approach of the transcribed text using a shared coding scheme. This allowed for the generation of generalized process maps, for each building permit authority to identify commonalities and variations. To ensure the validity, reliability, and triangulation of the results, a comprehensive approach was adopted, incorporating consistent interview guidelines, multiple interviewers, a unified coding system, peer debriefing, member checking, and collaborative efforts within the research team. The study underlines key differences in compliance procedures, approaches to risk management, and the roles of various authorities. Furthermore, our study highlights the challenges of standardizing these processes across regions, while also recognizing limitations in data representation and potential biases. The report aims to contribute to the field by uniformly modelling building permitting processes. It enables future studies, aiming to optimize the process and to develop solutions that can more effectively meet the needs of municipalities and regulatory authorities across Europe.

## 2. INTRODUCTION

Building permitting ensures public safety by enforcing construction standards that protect communities from hazards like structural failures and fire risks. It fosters accountability, helping to prevent costly repairs or rebuilds by ensuring compliance with regulations from the start. Together with planning, building permitting enables the society to steer the development of the built environment to manage the growing needs for housing, face environmental challenges and improve the safety and quality of life. Additionally, a transparent permitting process can stimulate local development, attracting investors and creating jobs while maintaining the social fabric of neighbourhoods.

The realm of building permits in Europe is marked by a complex tapestry of processes, regulations, and methodologies. Despite its critical role in shaping the urban landscape, detailed investigations into the building permitting process remain scarce, with only a few case studies providing fragmented insights [1]. This gap in knowledge about the overall building permitting process and its planning (zoning) aspects, its technical building control aspects and its permission to occupy aspects, not only hinders the optimization of these processes but also limits the potential for digital transformation—a key step in modernizing administrative and legal functions.



This report aims to fill this void by conducting a comprehensive comparative analysis of building permit processes across several European countries. By delving into the intricacies of these processes, we aim to achieve multiple objectives such as forming a basis for more efficiency in the process, provide a holistic perspective across Europe, and attempt to understand how technology is used to assist building permitting, and enhancing outcomes in the built environment. These insights can be used for creating better policies and enable vendors to create better solutions and encourage better practices. In regards of efficiency improvements, a thorough understanding of the existing permit processes is imperative to identify bottlenecks and inefficiencies [2]. This knowledge can lead to the development of streamlined procedures, potentially transforming manual operations into more efficient, digital ones [1].

The European Network of Digital Building Permits (EUnet4DBP) was established with the aim of exploring the potential for a unified approach for the successful implementation of a digitized building permit procedure by first identifying the importance of investigating current processes before any action [3]. Examining the administrative perspective is crucial to obtaining a deeper insight into the commonalities of the processes. It is not just about following procedures but understanding the 'why' behind them. Technologists, who play a pivotal role in digitizing these processes, prefer a holistic view of the system. The detailed study provided in this report can aid in aligning technological solutions with the practical realities of building permitting, ensuring more effective and user-friendly digital interfaces. At a broader level, policymakers can benefit from this study by gaining a comprehensive view of the building permit landscape across Europe. Such a perspective is a prerequisite for harmonizing policies at a regional level maintaining a coherent European framework whilst ensuring that regulations cater to the diverse needs of different countries [1], [3], [4].

The subject of building permits has gained significant attention in recent years due to its opportunities for digitalization. Consortium European Building Control (CEBC) is an international non-profit organization which represents professional bodies involved in building control systems. The organization includes in its membership government departments, professional bodies, institutions, and private companies. Their focus is on clustering data on building control systems, by collecting and organizing data on existing building control systems and delivery methods, while conducting extensive analysis on them to establish uniform data sets of best practices regarding building control. Their strategic activities include publishing annually a report that outlines their past activities to ensure an extensive dissemination, as well as conducting training that focuses on the competencies need for building control professionals across Europe [5]. The aim is to help implementing and understanding new requirements in the field, and the underlying principles and value of building control, fire safety engineering, reconstruction, renovation, and quality of buildings. It also focuses on the effect of climate change on the built environment and self-certification, among other interests. The CEBC report adopts a holistic view, encompassing a broad spectrum of practices and challenges across Europe. While it provides a comprehensive comparative overview, it lacks more detailed and deeper insights into specific components of building control systems. It also lacks more complex comparative elements, that require interpretation and qualitative analysis of building control system characteristics.

This study aims to address this gap by delving deeper into specific characteristics and by providing qualitative analysis through the descriptions of country systems, process maps and detailed process descriptions.



This report adopts a multifaceted approach to investigating and enhancing the model of the building permit processes. Initially, a comprehensive interview guideline is developed, drawing on insights from previous research results. This guideline ensures inclusivity by considering a diverse range of interviewers while maintaining a consistent standard for data quality. Subsequently, an empirical study is conducted through qualitative expert interviews, providing an in-depth exploration of the subject matter. The article aims to contribute to the field by modelling building permit processes on a detailed and unified basis, thus offering a nuanced understanding of the processes at various levels. To validate and contextualize the findings, the results are benchmarked against quantitative parameters such as durations and legal context. Additionally, comparisons are made with other benchmarks contributing to a comprehensive evaluation of the research outcomes. In summary, this report aims to shed light on the current state of building permitting processes in Europe. By providing a detailed comparative analysis, we seek to bridge the knowledge gap, facilitating improvements in efficiency, understanding, technological advancement, and policy development.

### **2.1 Outline**

The remainder of the report includes a background section in section 3. In section 4, the methodology of the study is presented. Section 5 explains the different building permit systems in the countries under study while section 6 represents the building permit processes in detail. The report terminates with a discussion section in section 7 and conclusion and future work in section 8.

## **3. BACKGROUND**

### **Describing building permit systems in general**

Internationally, the building permit systems are complex systems that are developed and evolved mostly independently. The factors influencing the evolution of these systems are numerous, beginning with the legislation that constitutes the legal basis for the systems, the type of the country's internal organisation and management structure, the level of technological progress etc. Through time, the building permit systems have therefore evolved into complex entities, which are very challenging to directly compare.

This issue was raised after the working group in the European Network for Digital Building Permits (EUnet4DBP) performed qualitative expert interviews to get an overview of the current state of building permit systems across Europe. The diversity of the initial results in the form of interview transcripts revealed a gap, meaning that some fundamental work in terms of taxonomy design was needed in this field. The working group, [6] designed a taxonomy of building permit systems based on expert knowledge within the group, qualitative external expert interviews and specially designed workshop with external experts.

The top-level hierarchy of a building permit system is comprised of four concepts representing its subsystems, namely the legislative system, the organizational system, the technological system, and the procedural system. The thematic scope of the taxonomy design is much broader than that of this report, as the taxonomy aims to cover and therefore provide classification of concepts for all the building permit system aspects.

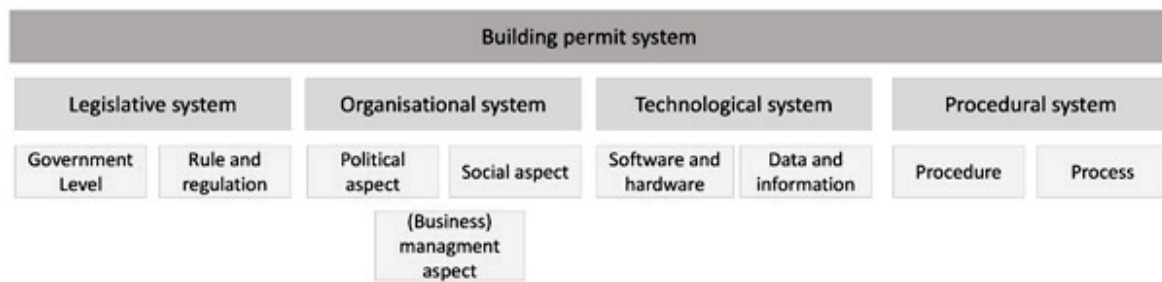


Figure 1: Overview of the Building Permit System, Subsystems and Categories [6]

This report is mainly focused on the procedural system, building on the qualitative external expert interviews. The broader view on the building permit system of each country is offered in section 5. In the next chapters, the report focuses on the processes aspect of the building permit system with detailed descriptions, which are accompanied by the standardized process maps. The comparison of the systems is performed based on the extracted and harmonized information from both descriptions and processes.

### 3.1 Comparisons on building permit (processes) in Europe and beyond

In the literature, it is possible to find several studies that have investigated and examined the processes for issuing building permits in order to evaluate their compatibility and comparability. The first comparative study found in the literature is of (Meijer et al., 2002) as they conducted an extensive analysis, examining eight European countries presenting a detailed documentation of the building permit process in two distinct studies [7]. The focus of the first document was on official building inspections while the second considered the technical requirements outlined in the legal texts. The nations examined included the Netherlands, The United Kingdom, France, Germany, Sweden, Norway, Belgium, and Denmark. The examination underscored that local authorities overseeing building permits were accountable for the permit procedures in all nations surveyed. The organizational complexities of these procedures were not thoroughly investigated due to the myriad potentialities and divergences. The articulation of technical prerequisites in building codes, a topic debated over numerous decades, exhibited considerable heterogeneity among the countries, frequently involving qualitative specifications open to diverse interpretations. Despite the common legislative goals among the nations, notable differences were noted in structural configurations and specific regulations [8]. The authors underscore the significance of comparing situations, such as tasks, responsibilities, and technical regulations, across countries, and advocate for tailored solutions to enhance procedure effectiveness and efficiency. This requires the introduction of online services to obtain information and apply for permits to aspire for the streamlining of regulatory processes. (Pedro et al., 2011) conducted a study that revealed significant uniformity in the foundational permit process across 27 European Union nations [9]. The research explored the potential for a unified construction market within the EU by employing a methodology that engages multiple experts through surveys and systematically analyses legal documents to compare building permit processes.

More specifically, the researchers identified key steps in the building permit process, including pre-consultation, phasing options, submission requirements, checks conducted, maximum time for plan approval, opportunities, and timing for objecting to a permit, commencement of construction, frequency and timing of site inspections, associated fees, and project

completion. While continental European countries adhered to a common pattern, the UK exhibited distinctive differences aimed at streamlining administrative aspects while ensuring compliance. In terms of processes, the focus was primarily on potential procedure types, albeit with a surface-level treatment of their intricacies. Even though the procedures for issuing building permits are administered by the law of the respective countries' government, if on one hand, many similarities emerge, also – on the other hand - own specificities and uniqueness emerge at the detail level of the processes.

In the comparison presented by Rückert's study (2011), several commonalities were found among the nations considered – Germany, Denmark, Poland, and Lithuania – while at the level of detail, disparities in several aspects predominate [10]. The study recommended standardization to enhance transparency in the processes associated with obtaining building permits.

The study disseminated by the Norwegian Construction Authority and conducted by [11], scrutinized operational methodologies in a selection of nations, encompassing Norway, Denmark, Sweden, Finland, the UK, USA (specifically New York City), Singapore, Hong Kong, Korea, Japan, and Australia. This investigation brought to light significant divergences, not only in the extent of digitization within the construction sector but also in the foundational procedures across the countries under comparison.

An additional investigation, utilizing World Bank data from the 'Doing Business' report, Jovanović (2016) systematically examined the process of acquiring permits in Slovenia and Croatia. This examination delved into the legal criteria, stage counts, and investor expenses involved. The comparative analysis brought to light both disparities and similarities in the two contexts, exposing corresponding advantages and drawbacks. Notably, a common model emerged from inherent procedural features in both countries, providing valuable insights into potential improvements for the prevailing building permit processes. The conclusions not only highlighted opportunities for enhancing construction permit procedures in both nations but also underscored identified shortcomings.

The 'Doing Business' report gathered data assessing the feasibility of business opportunities across 190 countries, encompassing a subcategory focused on managing construction permits [12]. The data concentrates on the comprehensive procedure for obtaining a building permit for a basic warehouse as an example, covering planning, submission, engagement of external third-party supervisors, and inspections, all viewed from the applicant's perspective. The data encompasses both the duration and the quantity of procedural steps, revealing substantial variations in results. It is apparent that the correlation between the number of procedural steps and the duration is not consistent, underscoring the importance of considering the interaction between these components.

Conducting an initial investigation of the building permit process in the United Kingdom, Netherlands, Sweden, and Slovenia, Noardo et al. (2019) aimed to synthesize and delineate a process for issuing building permits that incorporates both Building Information Modeling (BIM) and geoinformation (GeoBIM) [13].

The research's first phase involved examining existing procedures to comprehend the deficiencies and requirements of end-users, achieved through the submission of questionnaires to project participants. A high-level unified linear workflow is outlined based on current workflows, as there is a lack of diagramming depicting the interaction among



involved actors. Aiming to integrate GeoBIM into planning and permitting, a resulting workflow is designed through a parallel comparison of the core procedural steps.

The establishment of the European Network of Digital Building Permits (EUnet4DBP) took place in 2020 with the aim of formulating a unified approach to execute a proficient digitalized process for building permits [3]. Specifically, three pillars have been recognized within the context of digitizing the building permit procedure: (1) the process, (2) rules and requirements, and (3) technological tools. Indeed, the necessity to improve and reshape the procedure should consider the prevailing manual administrative methods entrenched in the existing protocols, which predominantly rely on paper and only partially on digital processes. Particularly within the scope of process enhancement, the importance of investigation and comparison becomes evident, including the importance of assembling and structuring present workflows.

Fauth and Soibelman (2022) have formulated a framework that takes into account the existing processes in Germany and the U.S. [14]. The objective is to compare and contrast these processes, establishing the groundwork for process standardization within an international context. Both processes have been investigated through semi-structured interviews directly engaging the authorities and then mapped. Drawing from the comparison, several insights were deduced. In particular, the following main steps have been identified: submission, pre-check, content check and notification of the outcome.

The Consortium of European Building Control (CEBC) presents findings on "Building Control e-delivery" incorporate results from a structured questionnaire involving contributions from numerous European Union countries, encompassing the United Kingdom and Turkey [15]. It is observed how most European countries have made substantial and ambitious efforts in developing user-friendly electronic facilities and initiating innovative projects related to Building Information Modelling (BIM).

As part of the CHEK project (Change Toolkit for Digital Building Permit) [16] to digitize the building permit in Europe, a study was conducted on the current state of the permit process in four European municipalities namely Ascoli Piceno, Italy; Lisbon and Vila Nova de Gaia, Portugal; Prague, the Czech Republic; and two additional municipalities: South Tyrol, Italy; and Skopje, North Macedonia [17]. The as-is processes were investigated through workshops, mapped, and then analysed to identify similarities and main steps. As a result, a unified map was produced that will be used as input for the definition of a new process that will take into consideration the adoption of BIM and GIS methods and tools within it.

The literature reveals a lack of in-depth analysis of the processes revealing that comparative studies conducted to date provide only a superficial and general perspective. In addition, aspects that are fundamental to the definition of digital process such as investigating the responsibilities of the stakeholders involved are only considered in a few recent studies. In order to acquire a more comprehensive set of comparative data that accurately represents the current status, it is essential to directly involve stakeholders who are intricately connected with the building permitting process.

### 3.2 Benchmarks on building permits

The countries that are included in this report vary significantly in size and other aspects. It is therefore very important to understand the background and context of the collected data about the building permit systems for each country. Table 1 aims to provide basic contextual information about the countries involved in the report. The data was provided by the country experts, together with the data access links for each country. As the data is not harmonized, comments are added to ensure correct understanding of the provided data.

Table 1: Statistical data for countries included in the report.

| Country        | Area [km <sup>2</sup> ] | Inhabitants (2022) | Number of building permits issued in 2022 | Source ID        | Comment ID |
|----------------|-------------------------|--------------------|---|------------------|------------|
| Austria        | 83.871                  | 8.956.000          | 58.924*                                   | [18]             | 1          |
| Belgium        | 30.528                  | 11.492.641         | 67.448                                    | [19]             |            |
| Czech Republic | 78.871                  | 10.516.707         | 86 049                                    | [20]             |            |
| Denmark        | 42.952                  | 5.952.575          | 39.621                                    | [21]             |            |
| Estonia        | 45 339                  | 1 357 739          | 11300*                                    | [22]             | 2          |
| Finland        | 338 432                 | 5 563 970          | 29 067                                    | [23]             |            |
| France         | 641.184                 | 68.042.591         | 1088508 (217 000*)                        | [24], [25]       | 3          |
| Germany        | 357.592                 | 84.400.000         | 217.586                                   | [26]             |            |
| Hungary        | 93.025                  | 9.603.634          | 35002*                                    | [27]             | 4          |
| Italy          | 302073*                 | 58851000**         | 60278***                                  | [28], [29], [30] |            |
| Lithuania      | 65.286                  | 2.869.145          | 8.004                                     | [31]             | 5          |

<sup>1</sup> \*Only residential building permits

<sup>2</sup> \*Only number of building permits in 2022 (Building Registry database) Construction notifications are not added. In Estonia, in one building permit, there can be more than one building - in 2022 16 298 buildings received permits in 11 300 permit procedures). If only houses are counted as buildings (in Estonia both facilities and houses count as buildings) then 6 411 building permits were issued for 7 486 houses.

<sup>3</sup> Statistics for France, including metropolitan France and overseas departments statistics. Including "Permis de Construire" and "Déclaration Préalable" types of authorisations. \*Only building permits ("Permis de construire" and "déclarations préalables" types) creating new housing (residential building) or creating new surfaces (non-residential buildings). Building permits related to extension of existing housing or any modifications without creation of surface (for non-residential buildings) areas are excluded."

<sup>4</sup> \*The statistics are based on building permits and simple notifications issued only for residential properties.

<sup>5</sup> Building permits for residential buildings - 7302



|                 |         |            |         |      |   |
|-----------------|---------|------------|---------|------|---|
| Montenegro      | 13.883  | 617.213    | 1.263   | [32] | 6 |
| Netherlands     | 42.000  | 17.942.895 | 64.000  | [33] | 7 |
| North Macedonia | 25.713  | 1.829.954  | 3.930   | [34] |   |
| Portugal        | 92.256  | 10.343.066 | 24.696  | [35] |   |
| Romania         | 238.397 | 19.659.267 | 43.660  | [36] | 8 |
| Slovenia        | 20.273  | 2.107.180  | 6.386   | [37] |   |
| Sweden          | 450.000 | 10.500.000 | 12044*  | [38] | 9 |
| United Kingdom  | 242.495 | 67.000.000 | 247.000 | [39] |   |

Additional internationally comparable data can be obtained from the ‘Doing Business’ reports from the World bank. Although it is being discontinued after 2020, the data available for the year 2019 provides a worldwide insight into selected topics, including building permit processes. Table 2 contains the data from the ‘Doing Business’ report for the year 2019. The report tracked the procedures, time, and cost to build a warehouse —including obtaining the necessary licenses and permits, submitting all required notifications, requesting and receiving all necessary inspections and obtaining utility connections. In addition, the dealing with construction permits indicator measured the building quality control index, evaluating the quality of building regulations, the strength of quality control and safety mechanisms, liability and insurance regimes and professional certification requirements. The most recent round of data collection was completed in May 2019.

Information is collected from experts in construction licensing, including architects, civil engineers, construction lawyers, construction firms, utility service providers and public officials who deal with building regulations, including approvals, permit issuance and inspections. To make the data comparable across economies, several assumptions about “the business, the warehouse project and the utility connections are used” [40].

According to the ‘Doing Business’ website, the ‘Doing Business’ score “...helps assess the absolute level of regulatory performance over time. It captures the gap of each economy from the best regulatory performance observed on each of the indicators across all economies in the ‘Doing Business’ sample since 2005. An economy’s ease of ‘Doing Business’ score is reflected on a scale from 0 to 100, where 0 represents the lowest and 100 represents the best performance” [40].

Table 2: Doing business report: Dealing with Construction Permits for the year 2019

<sup>6</sup> 368 for complex engineering structures - Building permit; 895 for other buildings - notification of building work

<sup>7</sup> <https://www.cbs.nl/nl-nl/nieuws/2023/07/minder-vergunde-nieuwbouwwoningen-in-2022>

<sup>8</sup> \*43660: for residential buildings

<sup>9</sup> \*Building permits for new residential buildings. It is the number of building permits, not the actual number of residential buildings.

| Country         | Dealing with Construction Permits score | Procedures (number) | Time (days) | Cost (% of warehouse value) | Building quality control index (0-15) | Dealing with Construction Permits rank |
|-----------------|---|---------------------|-------------|-----------------------------|---------------------------------------|--|
| Austria         | 75.1                                    | 11                  | 222         | 1.1                         | 13.0                                  | 49                                     |
| Belgium         | 75.5                                    | 10                  | 212         | 0.9                         | 12.0                                  | 45                                     |
| Czech Republic  | 56.2                                    | 21                  | 246         | 0.2                         | 8.0                                   | 157                                    |
| Denmark         | 87.9                                    | 7                   | 64          | 0.6                         | 11.0                                  | 4                                      |
| Estonia         | 82.6                                    | 10                  | 103         | 0.2                         | 11.0                                  | 19                                     |
| Finland         | 75.9                                    | 17                  | 65          | 0.7                         | 10.0                                  | 42                                     |
| France          | 74.3                                    | 9                   | 213         | 3.9                         | 13.0                                  | 52                                     |
| Germany         | 78.2                                    | 9                   | 126         | 1.1                         | 9.5                                   | 30                                     |
| Hungary         | 67.0                                    | 22                  | 192.5       | 0.6                         | 13.0                                  | 108                                    |
| Italy           | 68.3                                    | 14                  | 189.5       | 3.4                         | 11.0                                  | 97                                     |
| Lithuania       | 84.9                                    | 13                  | 74          | 0.3                         | 13.0                                  | 10                                     |
| Montenegro      | 76.1                                    | 9                   | 102         | 4.9                         | 10.0                                  | 40                                     |
| Netherlands     | 69.4                                    | 13                  | 161         | 3.6                         | 10.0                                  | 88                                     |
| North Macedonia | 83.5                                    | 9                   | 91          | 3.5                         | 13.0                                  | 15                                     |
| Portugal        | 73.2                                    | 14                  | 160         | 1.2                         | 11.0                                  | 60                                     |
| Romania         | 58.4                                    | 24                  | 260         | 2.0                         | 13.0                                  | 147                                    |
| Slovenia        | 65.3                                    | 17                  | 247.5       | 2.7                         | 13.0                                  | 119                                    |
| Sweden          | 78.0                                    | 8                   | 117         | 1.9                         | 9.0                                   | 31                                     |
| United Kingdom  | 80.3                                    | 9                   | 86          | 1.1                         | 9.0                                   | 23                                     |

#### 4. METHODOLOGY

The methodology used for the study presented in this report is based on data collection, data preparation, data evaluation and result interpretation, as shown in Figure 2.

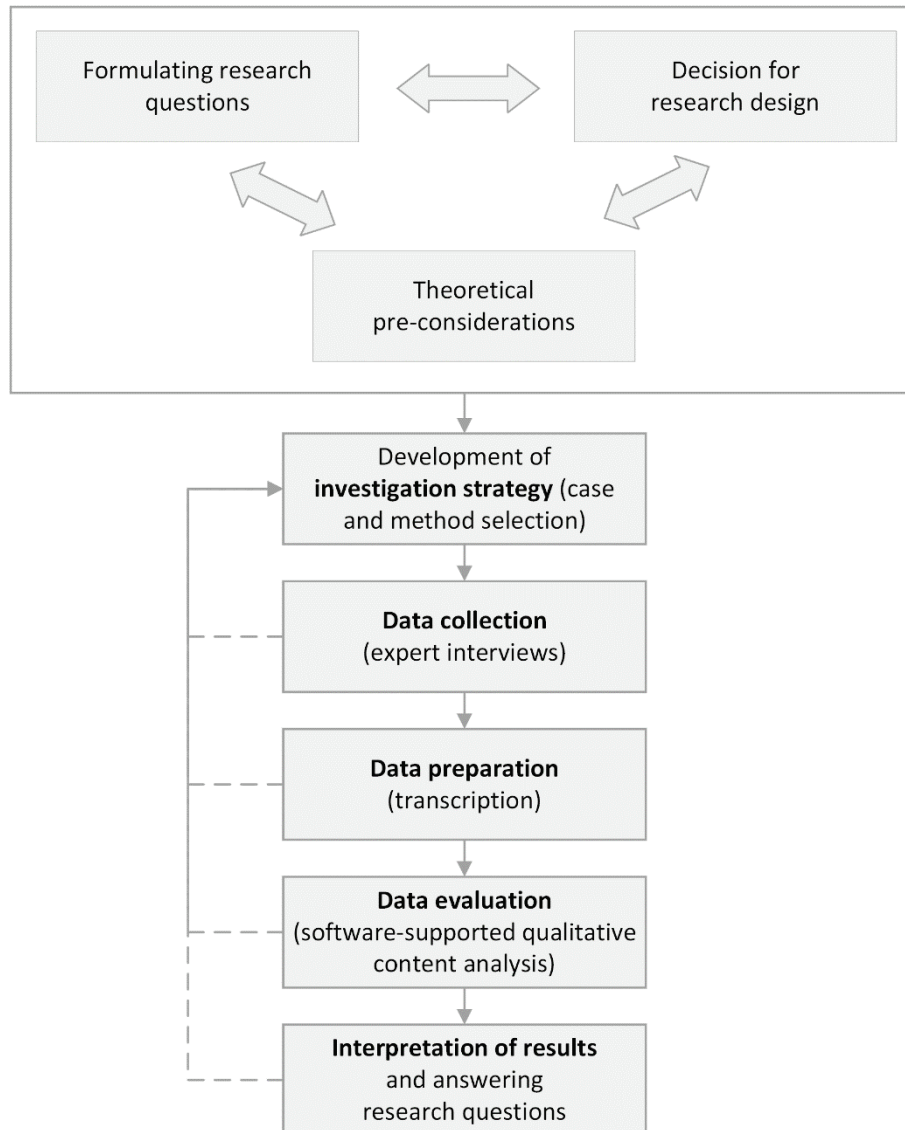


Figure 2: Overview of the research methodology.

#### Data Collection

Data collection for this study involved conducting interviews with individuals employed in municipalities who are actively engaged in building permitting processes. The aim was to gather insights into the challenges and perspectives related to building permitting. Three interviews were conducted in each country, with participants representing different sizes of authorities: one from a large municipality (more than 500,000 inhabitants), one from a medium-sized municipality (between 50,000 and 500,000 inhabitants), and one from a small municipality (less than 50,000 inhabitants). Some exceptions are made due to the size of the country (e.g. two small municipalities were interviewed in North Macedonia instead of a large municipality) or unavailability of some municipalities. By involving multiple perspectives from

different type of settings large, medium, and small municipalities, the study captures a well-rounded view of the building permit processes in each country. Due to several reasons, it was not possible to conduct up to three interviews per country. Table 3 shows an overview of the interviews conducted. The interview questions were designed by the lead author, drawing upon prior research (Fauth, 2021; Fauth & Soibelman, 2022). Interviews were conducted by the authors in the participants' respective native languages, involving 18 different interviewers who carried out 46 interviews across 17 languages in 19 countries between June 2022 and April 2023.

Each interviewer underwent a one-on-one training session with the lead author, where the research methodology and interview questions were explained in detail, and any questions from the interviewer were addressed. Interviewers were also introduced to the Participant Information Sheet (PIS), which outlined the study's purpose, background, data management, and confidentiality protocols. Each interviewer translated the PIS from its original English version into the appropriate national language.

Recruitment of participants, consisting of municipal building permit officers, was conducted independently by each interviewer in their respective countries. Participants were recruited through existing professional networks or cold outreach via email. The interview questions were primarily aimed at understanding the building permit process to facilitate the development of process maps (Section 7). Descriptions of country-specific systems (Section 6) were compiled using the interviewers' local expertise, interview data, and supplementary desk research. In certain cases, additional national experts were consulted for further insights [41].

The interviews were audio-recorded for accurate documentation. In total, 46 interviews in 19 countries (Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Lithuania, Montenegro, Netherlands, North Macedonia, Portugal, Romania, Slovenia, Sweden, United Kingdom) were collected. Figure 3 shows that the involved countries and their geographical location.

Table 3: Overview of the conducted interviews

| No. | Country        | Number of interviews | Type of interviewed agency (S (small) -M (medium) - L (large)-N (national)- O (other)) | Number of words conducted in transcripts |
|-----|----------------|----------------------|--|--|
| 1   | Austria        | 3                    | S,M,L  | 3,364                                    |
| 2   | Belgium        | 3                    | S,M,L  | 20,971                                   |
| 3   | Czech Republic | 2                    | S,L  | 16,868                                   |
| 4   | Denmark        | 2                    | S,M  | 24,258                                   |
| 5   | Estonia        | 3                    | S,M,L  | 14,725                                   |
| 6   | Finland        | 3                    | S,M,L  | 27,381                                   |
| 7   | France         | 2                    | S,M  | 22,291                                   |

|    |                 |   |       |        |
|----|-----------------|---|-------|--------|
| 8  | Germany         | 3 | S,M,L | 24,784 |
| 9  | Hungary         | 1 | N     | 2,840  |
| 10 | Italy           | 3 | S,M,L | 17,356 |
| 11 | Lithuania       | 2 | M,L   | 12,990 |
| 12 | Montenegro      | 1 | N     | 5,538  |
| 13 | Netherlands     | 2 | S,L   | 10,673 |
| 14 | North Macedonia | 3 | S,S,M | 9,528  |
| 15 | Portugal        | 3 | S,M,L | 22,250 |
| 16 | Romania         | 3 | S,M,L | 8,987  |
| 17 | Slovenia        | 3 | S,M,L | 4,773  |
| 18 | Sweden          | 3 | S,M,L | 15,407 |
| 19 | United Kingdom  | 1 | L/O   | 4,214  |



Figure 3: Map of Europe highlighting the conducted countries.

## Data Preparation

Following the interviews, the audio recordings were transcribed, either manually by the researchers or using transcription software. The transcripts were then translated into the language of analysis, ensuring accurate representation of participants' responses.

The transcripts underwent a "clean-up" process, during which irrelevant parts, dialects, fillers and pauses and any personal identifiable information were removed. The transcripts were also pseudonymized to ensure the anonymity of participants.

## Data Evaluation

In the data evaluation phase, each interviewer was responsible for decoding and analysing the interviews they conducted. Interviewers who were not directly involved in conducting the interviews performed a review for quality assurance. The analysis involved identifying and assigning codes to specific segments of the text using a unified coding system (based on the building permit process steps). This systematic approach facilitated the identification of patterns and themes across interviews. The use of qualitative analysis software was employed to aid in organizing and categorizing the coded data.

## Process Mapping

Based on the analysed and decoded text, the next step involved textual and visual analysis of the transcripts to map the building permitting processes for each municipality. Subsequently, the mapped processes were analysed and generalized within each country. Later, the diagrams for one country were combined within one country diagram. The diagrams were typically developed by each interviewer, resulting in one diagram per municipality for each interview. In certain instances, the lead authors were responsible for creating a diagram. However, the combined version of the country diagrams—comprising one to three diagrams depending on the number of interviews—was assembled by the lead authors. All interviewers reviewed the combined country diagrams for reliability and consistency, with revisions made as necessary. The maps, findings and questions were discussed during bi-weekly meetings over more than one year period.

In practice given the example from Denmark the Danish author conducted the interviews in Denmark and decoded them afterwards. A lead author reviewed the coding. The Danish author created a diagram for conducted interview. The results were presented and discussed in meetings. The lead authors combined the Danish maps into a country diagram. The Danish author reviewed the combined country diagram. The lead authors revised the country diagram if needed.

In order to best express the procedures interpreted from our results, we have made use of Business Process Model Notation (BPMN) 2.0 representation. BPMN 2.0 is the de-facto standard for business process diagramming and can be used not only to express processes, but also allow to be translated into software components. BPMN 2.0 represents a significant enhancement of the BPMN standard. It introduced a more comprehensive set of elements depicting business processes' nuances, including additional events, activities, gateways, and data objects. One of the standout features of this version is its ability to handle process hierarchies and sub-processes. This is crucial for understanding complex processes by breaking them down into more manageable, interrelated sub-processes. Furthermore, BPMN

2.0 provides improved support for choreography and conversation modelling, which is vital for capturing interactions between different entities. Additionally, it supports process execution by including elements for technical modelling, thus bridging the gap between business process design and implementation. In our study, these features allowed for a more detailed, nuanced, and accurate modelling of the building permit processes across different countries.

### **Hierarchical Categorization: Main Processes and Subprocesses**

Building upon the tax proposed by Fauth et al. [6], we structured the process/categorization steps into two primary levels: main processes (level 1) and subprocesses (level 2). This hierarchical arrangement provided clarity and facilitated easier alignment between each country's municipalities. It is important to note that our focus was on the main and immediate subprocesses, deliberately excluding the deeper level 3 subprocesses to maintain clarity and avoid overwhelming detail in the categorized BPMN-diagramming process.

### **Describing building permit systems for the investigated countries:**

The descriptions of the building permit systems for each of the investigated countries were gathered to facilitate a comprehensive understanding of their respective frameworks. This approach enables a broader contextual interpretation of the detailed process descriptions and diagrams. In order to ensure consistency, the systems were presented in a uniform manner by employing the top-level taxonomy of building permit systems as outlined in [6]. Each country's system is characterized through a description of its legislative framework, organizational structure, technological system, and procedural system. These descriptions were independently prepared by the authors of the report, forming a distinct and systematic examination of each system. By structuring the information in this way, the analysis provides a foundation for comparative assessment, allowing for deeper insights into both the shared elements and unique attributes of the building permit systems across different national contexts.

By bringing together qualitative data, BPMN, and expert knowledge, we were able to construct a comprehensive and comparable picture of the building permit processes within 19 European countries including different sized municipalities.

The creation and validation of a BPMN categorization system based on a detailed taxonomy were pivotal in our study. This methodology allowed us to condense complex processes into a structured and combined format, contributing significantly to the understanding and analysis of building permit processes within various European countries. The iterative process of validation, coupled with expert input, reinforced the reliability and relevance of our findings, offering a benchmark for future research.

## **5. BUILDING PERMIT SYSTEMS IN EUROPE**

In this section, the descriptions of the building permit systems on holistic level are provided to a broader understanding of the countries investigated.



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## 5.1 Austria

### 5.1.1 Legislative system

Building in Austria is mainly regulated by the building codes of the nine federal states. The building code regulates procedures and building regulations. Each federal state has its own building code, which sets out specific regulations and requirements for the respective federal state. In addition, each federal state regulates spatial planning and zoning through its own Spatial Planning Act [42]. These laws determine which areas may be used for which purposes and lay down the principles of spatial development. However, the exact building regulations (building height, building density, etc.) and the specific designations (building land, grassland, etc.) are determined by the municipalities and cities.

Another component of Austrian building law is the 'OIB' guidelines. They define technical requirements (e.g. fire protection, energy efficiency) for various aspects of building and ensure uniform standards throughout Austria [43].

Another legal aspect in construction is the environmental impact assessment (UVP). The UVP in Austria is regulated by the Environmental Impact Assessment Act (UVP-G). It serves to examine the effects of certain projects on the environment in advance and to counteract possible negative influences. In addition, this procedure is intended to combine all necessary notices from the legal areas (building permit, operating permit, etc.). In normal procedures, these permits are independent and are considered separately. Not every construction project has to undergo an UVP; this depends on the type and size of the project [44].

### 5.1.2 Organisational system

In Austria, building permits are mainly issued by the building authorities of the 2,095 municipalities and cities. Several instances may be involved in a building permit: The building department/municipal building office is usually the first point of contact. Here, the applications are first checked and, if all requirements are met, also approved. In many municipalities, the mayor has the first decision-making power in building permits. If a decision of the mayor is appealed, the municipal council can act as an appeal body. Appeals against decisions of the municipal council may be lodged with the Regional Administrative Court or, subsequently, with the Administrative Court of Appeal.

In the case of larger construction projects or in special cases (including environmental impact assessment), the state government may also be involved. The number and structure of the offices varies depending on the size and complexity of the municipality or city. Some offices are linked to other departments, such as the heritage protection authority. Smaller municipalities usually have only one department with 1-2 persons [45]

### 5.1.3 Technological system

Many municipalities now offer online platforms through which pdf applications can be submitted and processed [46]. There are also efforts to further digitize national platforms and databases for cadastral and land registration.

In addition, the electronic Official Announcement System (eLAK) supports the digitization of building law procedures and ensures a more transparent, efficient process. elak is a



nationwide exchange standard for public authorities [47]. Another advance in the digitization of construction in Austria is the EU research project BRISE Vienna. BRISE Vienna enables stakeholders to submit building applications with openBIM (ifc), which allows for an automatic check of legal requirements [48].

#### 5.1.4 Procedural system

In Austria there are several procedures for obtaining a building permit, including the building notification and building licence, each being regulated in the respective building codes. The type of procedure depends on the type and size of the building project, the existence of a zoning plan and other factors. Before the actual building application, a meeting with the building authorities may also be held in order to clarify certain issues in advance. After the building permit has been issued, the building supervisory authority has the right to visit the construction site and check compliance with the regulations. After completion of the construction work, a notice of completion must be submitted to the authority [49].

### 5.2 Belgium (region of Flanders)

#### 5.2.1 Legislative system

The ‘Flemish Codex Spatial Planning’ (‘Vlaamse Codex Ruimtelijk Ordening’ [50]) is the legal basis for all permits in the realm of urban planning. Also, on a building scale level, there exist several technical regulations, e.g. accessibility [51], fire safety [52], energy use [53]. There exist a multitude of technical regulations and only a limited number are checked by the authorities. The majority of the regulations are to be implemented by the architect, who is therefore responsible for them.

#### 5.2.2 Organisational system

Although applications for building permits are submitted to the regional (Flemish) authorities, the actual management and assessment is carried out by the municipalities. At this level, the applications are handled by a building permit officer who gathers all the advice formulated by internal (urban planning, fire brigade) and external (energy use, accessibility, heritage, mobility, etc.) agencies. The officer writes up their advice and forwards it to the council where a final decision is taken.

#### 5.2.3 Technological system

In general, applications for planning permission are submitted digitally to the regional online platform, which forwards them to the relevant building permit authority. There is a beginning of GIS involved, which replaces the traditional situation plan, but the rest of the system is far from digital, since drawings of the planned building, are submitted as pdf-files and manually reviewed by building permit officers.

#### 5.2.4 Procedural system

When the building permit application is submitted to the regional authority, it is forwarded to the relevant building permit authority. A completeness check is carried out to ensure that all the required documents are included in the application. This is usually done by a group in the

building permit department. If all the documents are included, a building permit officer is assigned to the case and reviews the application against existing urban planning regulations. At this point, the application is also made available to the public, who have the opportunity to submit objections. The officer also handles any necessary referrals (both within the building permit authority and externally). The officer writes up their advice and forwards it to the Council, which makes the final decision.

### **5.3 Czech Republic**

#### 5.3.1 Legislative system

The building permits in the Czech Republic are characterised by a considerable amount of legislation. The basic legal regulation for building permits is the Act on Spatial Planning and Building Regulations [54] (Building Act), which is accompanied by a number of implementing regulations [55] concerning the content of documentation, requirements for construction or the functions of designated persons. The whole procedure can be divided into several steps: the zoning process (the location of the building meets the conditions of the area), the construction process (the building complies with its requirements), approval of the building for use (compliance of the construction with the permit). The Building Act has been updated to allow the first two processes to be merged in time. The next approved update foresees steps towards digitalization, but new versions of the implementing regulations are still under preparation (status in August 2023).

#### 5.3.2 Organisation

Municipal and regional authorities, the Ministry and, in the case of military areas, the Ministry of Defence have the competence in matters of spatial planning under the Building Act in Czech Republic. Building procedures are carried out by building authorities, which are assigned to administrative districts, usually identical to municipalities. Separate special authorities are designated for transport, aviation, water and military constructions.

Building permits are issued by the competent building authority according to the area where the building is located. After the completion of the construction, another approval procedure take place, when the execution of the construction in accordance with the issued building permit is checked.

#### 5.3.3 Technological system

Submissions for building permits are in hard printed copy. Some authorities then agree to electronic communication. In this case, the drawings of the planned building (floor plans, sections, diagrams, views, etc.) and the site plan are submitted in pdf format and checked manually by the building permit officers. The new Building Act foresees the creation of a so-called Builder's portal where selected file formats can be uploaded. However, the checking of the content will be mostly manual (human-readable) again for the time being.

Discussions are underway to develop information requirements to check selected tasks on the submitted documents.

#### 5.3.4 Procedural system

Once an application for building permission has been submitted, the building is allocated to an officer in accordance with the internal procedures of that authority. The officer reviews the completeness of the documents supplied, their compliance with any regulatory measures, the zoning plan and the technical requirements for the structures. The submitted set of documents also includes statements from representatives of technical and transport infrastructure and other so-called concerned authorities (environmental protection, monuments, water, air, etc.). The list depends on the type of construction. The officer contacts the owners of neighbouring land, other entities designated by the legislation and informs them about the ongoing construction procedure. If necessary, he/she convenes a meeting on site. Persons and organisations contacted may express their opposition. In case of disagreements, there is an institution of a superior authority in the Czech Republic which resolves disagreements.

This part of the process is simplified by the new Building Act. In the Czech Republic there is also the institution of an authorised person [56] on the side of the designer. The documentation prepared by an authorised person is considered being correct and is not technically reviewed further. Depending on the type of construction, the official may select the parameters to be technically checked on the project or may request an assessment by another expert. The new Building Act, other related laws in preparation and their implementing regulations should supplement the information that will be included in the documentation in a structured form.

### **5.4 Denmark**

#### 5.4.1 Legislative system

In Denmark, the building permit system is primarily governed by the Building Act (Byggeloven [57]). Besides various construction-related matters, the Building Act classifies buildings and stipulates the requirements and conditions for each category of buildings. There are several regulations associated with the Building Act, which address specific topics such as energy performance, documentation, and others. The building permit processes are chiefly governed by the Administrative Law (Forvaltningsloven [58]), which oversees all official procedures in Denmark. Spatial planning is controlled by the Planning Act (Planloven [59]). Municipalities in Denmark carry the primary responsibility for spatial planning. Municipal spatial plans encompass the entirety of Denmark and establish general rules for construction and other interventions into the environment.

#### 5.4.2 Organisation

In Denmark, the procedures for issuing building permits are overseen by the municipalities. The size in terms of staff numbers and departments largely depends on the area and population density. The City of Copenhagen, being Denmark's capital, is the largest and boasts a dedicated environment sector responsible for building permits.

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### 5.4.3 Technological system

From a digitization perspective, the building permit system in Denmark is undergoing a digital transformation. The building permit application are submitted and managed and submitted digitally (Byg og Miljø [60]). During the review process, several digital tools, like official databases and portals for cadastral data, are utilized and different digital solution are used to manage the building permit authority's internal processes, which are connected to 'Byg og Miljø.'

### 5.4.4 Procedural system

Prior to the submission of the application, documentation specified by the Building Act must be prepared, which is specified in the 'Byg og Miljø' platform. The applicant is required to obtain all consents from various agencies before submission. The number and types of consents hinge on the nature of the project (cultural heritage protection, water and flood protection, compliance with municipal spatial planning). The detailing of the construction plans isn't extensive. More detailed documentation, as required by the Building Act, is mandated later, before actual construction commences, and is subject to inspection. The official at the building permit authority reviews the documentation and all consents. If there's anything missing, the applicant is contacted and requested to furnish the requisite additional documentation.

## **5.5 Estonia**

### 5.5.1 Legislative system

Construction and construction design, including building permit requirements in Estonia are regulated primarily by the Building Code [61]. The purpose of this code is to promote sustainable development and ensure safety, purposeful performance, and usability of the built environment. In addition, there are 20 more detailed Ministry level regulations referred to from Building Code. Most of them are relevant for building permit process.

The building permit process as administrative process is regulated by the Administrative Procedure Act [62], which regulates all official processes in Estonia.

Spatial planning is regulated by Planning Act [63]. In Estonia, the municipalities carry the primary responsibility for spatial planning on municipal level. Municipal spatial plans are divided to master plans/comprehensive plans that are mostly for entire municipality or for bigger municipalities for a district and detailed zoning plans, that are mostly for one or few cadastral units. Detailed zoning plans are basis for building permit, and they define general rules for construction and other interventions in the environment. There is also national level of planning. National spatial plans are prepared for larger projects with national importance.

For some type of buildings, there are additional laws with their more specific regulations, that are not covered with Building Code, but are relevant for building permit process. These are following:

**Public Health Act** [64] - valid for schools, kindergartens and water facilities like pools and spas; Occupational Health and **Safety Act** [65] - valid for office buildings; **Fire Safety Act** [66] - in

addition to fire safety requirements set in the Building Code; **Tourism Act** [67] - valid for accommodation buildings like hotels and hostels; **Heritage Protection Act** [68] - requirements for buildings under heritage protection;

**Product Conformity Act** [69] - requirements for building products.

Together with the Building Act and its regulations, there are about 50 national level regulations, that must be followed for the building permit process. Each local authority has a building ordinance which includes regulations based on local conditions. These regulations are necessary for organised and appropriate building, taking cultural, ecological and scenic values into account, and for creating and maintaining a good living environment. The building ordinance regulations may concern construction sites, the size and location of buildings, a building's suitability for its surroundings, the method of construction, planting, fences and other constructions, management of the built environment, organisation of water supply and drainage, definition of areas requiring planning, waste managements, parking and other corresponding matters of local importance on building.

### 5.5.2 Organisational system

In Estonia, building permits are processed by local municipalities (79 in total). In some cases, regulated by the Building Code, competent authority to provide building permit instead of local municipality is Consumer Protection and Technical Regulatory Authority (state department). Building permits are granted by the city or parish administration in the session, which is political body of the municipality. In some municipalities this task is delegated to building permit officials and political administration is not involved. Number of employees related to building permitting depends largely on the size of municipality and can range from about 100 employees (City of Tallinn) to only 3-5 employees in smaller municipalities.

### 5.5.3 Technological system

Since 2016 building permit process goes through digitised environment in National Building Registry [70] (*ehitisregiser* – EHR).

Mandate of using Building Registry is set in Building Code § 40. This means that all 79 municipalities in Estonia have to use the procedural environment of the Building Registry to process building permits even if the construction design documentation is received on paper. In that case local municipalities have to scan the documents, add them to Building Registry and start the process of building permit. Building Registry is a central registry controlled by the Ministry of Climate. Data in the registry is owned by users – homeowners, utility networks owners and local municipalities.

In February 2024, BIM-based building permit process possibility was introduced to everyone in Estonia. BIM-based building permit adds possibility to look the solution in 3D (IFC viewer embedded to Building Registry) including surrounding area of the building (integration with National Digital Twin [71]). BIM based permit process has 47 automatic checks against the Building Code that are shown to both applicants and processor in a simple UI solution. Further checks can be added with simple IT development, that will be done centrally in the ministry. Local municipalities don't need expensive hardware/software and high BIM specific user skills for adopting BIM based permit process. In addition to automated rule checking, technical data about the building, that is needed to be inserted to the Building Registry manually now, will



be extracted from IFC format BIM model and sent to building permit application automatically. This feature will save time and reduce possible errors occurred by double insertion of the data.

#### 5.5.4 Procedural system

Building permit is applied with the preliminary stage construction designs, which consists of graphical representation of architectural design, site plan and fire safety and brief textual descriptions of technical systems and load bearing structures.

The process is generic in the sense that the process differs somewhat depending on the building type and its size. Also, permit practices vary between municipalities, but due to central permitting system of National Building Registry, these variations are minimal and don't affect the overall process.

Before a building permit can be issued, the building project has to meet the requirements set by the authorities, and it has to comply with regulations and good construction practices. Neighbours and other interested parties (set by detail zoning plan, design conditions and Administrative Procedure Act) are involved in the permitting process by local government. During the processing of the permit application, the building permit application is checked, and, if necessary, and statements from other building authorities are required by the permitting authority, who is responsible for involving all necessary parties to the permitting process.

A building permit can be issued when all the information regarding the construction project is registered, and the required textual and graphical materials about construction design have been submitted. In the decision-making phase, the building control authority makes a decision, signs building permit or refusal of giving building permit as administrative act in the Building Registry. The approved building permit decision is recorded in the Building Registry, and after the appeal period, the decision is legally binding.

### **5.6 Finland**

#### 5.6.1 Legislative system

The building permitting process is regulated by the current Land Use and Building Act (Maankäyttö- ja rakennuslaki [72]). The legislation is being currently renewed and the new Building Act (Rakentamislaki [73]) will enter into force on January 1, 2025. However, the permit processing time guarantee, the calculation of the building's carbon footprint, and the permit in data model format will come into force on January 1, 2026. The new act incorporates measures to combat climate change into the building legislation. The act will also smoothen the construction processes, boost a circular economy and digitalisation and improve the quality of building. Furthermore, the municipalities have their own building regulations<sup>[OBJ:OBJ]</sup>. The building regulations have historically been the most important element regulating construction in cities and densely populated settlements before zoning became common.

#### 5.6.2 Organisation

The building permits are handled by the building control services which commonly is part of the urban environment department in bigger municipalities or technical department in

smaller ones. Building permits are granted by the political “environment and permit committee” but like in other Nordic countries, there is often a delegation to building permit officers to grant building permits. The building control services in big cities like Helsinki can be divided into regional permit teams. These teams consist of permit secretaries, permit architects, landscape architects and team leaders. The structural and HVAC issues are handled by separate teams.

### 5.6.3 Technological system

Applications for building permits are submitted mostly digitally, by using two customer service systems, ‘Cloud Permit’ and ‘Trimble eServices’. These services allow for sharing the permit documents among the permit project stakeholders. Larger building projects usually deliver BIM models as part of the documentation. Systems for automatic permit data processing and archiving are currently being developed by several development projects. A national built environment information system is being created (Ryhti [75]) for laying the foundation for the digital utilisation of planning and construction permit data in Finland. The key elements of the new model are the commonly agreed data structures, legislation, and access to data in one place.

### 5.6.4 Procedural system

The Finnish permit procedure relies heavily on pre-negotiations during the feasibility study or early design phase of a construction project. Permit documentation can be submitted to the customer e-service at a draft stage to be used at the pre-negotiations.

There are both cityscape and zoning-related negotiations and technical ones. The rationale behind the pre-negotiations is to ensure the smooth handling of the project and to avoid critical issues later in the process.

After completing the documents, the building permit application is marked as complete in the system. The application proceeds into a job queue and the handlers are selected.

Informed by the pre-negotiations, the process continues into formal review, content review, statements from stakeholders, and decision. The reviews are made partly in collaborative team sessions within the building control services, regional urban planning and with the political permit committee. The architectural and the technical review process are two parallel streams of the process.

An important part of the permit process is checking the designers’ and commenting experts’ competences. Because the building control officers can perform only random spot checks to due to their limited resources, the competence check is essential for ensuring the quality of the application.

The different municipalities’ permit processes vary greatly across Finnish municipalities. From the construction companies’ perspective this complicates their project realizations nationwide. There is a growing need for harmonizing the permit processes, also for reasons related to increasing process automation.



## 5.7 France

### 5.7.1 Legislative system

In France, the building permitting process is primarily regulated by the Planning Code [76] (*Code de l'Urbanisme*) which brings together the legislative and regulatory provisions relating to planning laws. Building permits are granted on the basis of a town planning document in force, or according to national town planning regulations [77].

### 5.7.2 Organisation

In France, building permits are planning permissions usually handled by the urban planning department at the municipalities. Building permits are usually granted by the Mayor (who is an elected official). However, depending on the nature of the construction project and the nature of the applicable town planning document, the administratively competent Authority to grant the building permit may be: the Mayor on behalf of the building permit authority; the President of the EPCI on behalf of the EPCI ('Établissement public de coopération intercommunale'\*); when the building permit Competence is transferred or delegated to the EPCI; the Mayor on behalf of the State; or the Prefect. \*Administrative structure allowing several municipalities to exercise some administrative competences jointly.

In France there is a unique national process and submission form for building permit application, regardless of the building permit authority where the permit is submitted. The building permit officers (in the urban planning department) reviews the permit application against the town planning documents. They also initiate the mandatory consultations with the different agencies depending on the nature of the project and its location. Finally, the permit is granted or refused by the mayor (or the competent authority where applicable).

### 5.7.3 Technological system

Paper and digital coexist. Applications for building permits can be submitted digitally or on paper. In case of paper submission, the permit application must be submitted in several copies. Paper or digital submission is the choice of the applicant. Digitalization is still heterogeneous and quite recent in France. On January 1<sup>st</sup>, 2022, two requirements came into force simultaneously: all municipalities are required to receive building permit applications electronically [78] (dedicated email address, contact form, or specific teleservice, etc.); municipalities with more than 3,500 inhabitants must have a specific remote procedure enabling them to receive and process building permit applications in dematerialized form [79].

Drawings of the planned building (floor plans, facade drawings, integration of the building into the landscape, etc.) as well as the situation plan, are generally submitted as pdf-files and manually reviewed by building permit officers.

### 5.7.4 Procedural system

When the building permit application is submitted to the building permit authority, a completeness check is done to see if all required documents are included in the application, and if they contain all the information it should contain. The application is registered in the authority's system. In case of missing documents or information, the applicant is notified that



additional information or documents are requested. The assigned building permit officer reviews the building permit application against the town planning documents. In parallel, the officer also initiates the mandatory (and optional) consultations with various agencies depending on the nature of the project and its location. For example, the Architecte des Bâtiments de France (ABF) for a project located in the perimeter of a building registered as a historic monument, the Departmental Advisory Commission for Safety and Accessibility in case of building open to the public, networks operators and so on. Based on the opinions issued by the agencies and the detailed review carried out by the building permit officer, the permit is granted or refused by the mayor (or the competent authority where applicable). The decision takes the form of an Order signed by the mayor. If there is no response by the end of the permit application period (the deadline varies according to the authorization requested and the project location), the project is presumed accepted. This is known as tacit building permit. Once the building permit is granted, the applicant must display the permit on construction site, in the form of a notice board including the permit number throughout the construction period. Before starting work, the applicant must notify the start of the works on a form sent to the building permit authority.

## **5.8 Germany**

### 5.8.1 Legislative system

The building permitting system in Germany is regulated by the Building Codes (Landesbauordnungen [80]) which exists each of the 16 states and one model building code as a recommendation for the states. Among other matter related to construction, the Building Codes provides classification of buildings and defines the requirements and conditions for each group of buildings. Furthermore, there is a Planning Act (Baugesetzbuch [81]) on national level which covers regulations on spatial planning. In addition, there could be municipal development plans or other regulations considering spatial planning and construction subjects. Moreover, there are other specific regulations such as the Building Energy Act (Gebäudeenergiegesetz [82]) which needs to be considered for design and construction. As all processes in public administrative units in Germany, the building permit process is oriented towards the Administrative Procedure Act (Verwaltungsverfahrensgesetz [83]) which exists on national and state level. The Administrative Procedure Act regulated for example the management of discretion within a public administrative process. There are the standards XBau [84]<sup>1</sup> (serving as the established norm for communication among stakeholders engaged in building review processes) and XPlanung [85] (that is a data standard enabling smooth transfer of urban plans between IT systems and online availability).

### 5.8.2 Organisation

In Germany, the procedures for issuing building permits are managed by building permit authorities, which can be part of a municipality (bigger cities) or a county. There are approx. 851 “lower” building permit authorities which review building permit application. Depending on the state, there are also “higher” and “highest” building permit authorities which review for example federal buildings and have a supervising role towards the “lower” building permit authorities. The size in terms of numbers of employees and departments is very different and span from 3 employees to several hundred. Every public administrative unit has the right to self-organize itself. That means that every building permit authority can be structured

differently. In some cases, they are connected to other departments (e.g., heritage department), in other cases they are totally separated.

### 5.8.3 Technological system

From the perspective of digitalisation, the building permitting system in Germany has been starting to be digitized on national and state level. A software solution for a browser-based online platform is partly implemented and tested in Germany. The platform also provides the option for communication between different stakeholders. There are more than 15 different back-office application used in German building permit authorities. Individual building permit authorities provide an electronic submission of the building application as an option since several years while a paper-based application is still regulated but the law (Building Code) has opened to accept other forms than the paper-based form. Official databases and portals for cadastre, land registry are used as well.

### 5.8.4 Procedural system

In Germany, several procedures exist to get a building permit granted: (1) Construction projects not subject to procedures, (2) Permit exemption, (3) Simplified building permit procedure, and (4) "Comprehensive" building permit procedure. The application depends on if a development plan for the area exists, how the complex the building is, etc. There is also the option to apply for a preliminary building request as a previous step in advance to the actual permit and where a very few questions can be asked which answers are legally bounded for a defined period of time.

The review of a building application starts with the submission to the building permit authority. After an administrative review, the content will be proved against planning and building regulations. The participation of other stakeholders will be done by the building permit authority. After the building permit is issued, the building permit authority has the right to visit the construction site several times on their own convenience. The start of the construction site and the completion of the construction needs to be noted by informing the building permit authority via a form. In 2022, 217.586 building permits were issued in Germany. Of that, 136.656 were residential buildings.

## **5.9 Hungary**

### 5.9.1 Legislative system

Except for construction activities that can be carried out without a permit or after notification (for example: to construct a building of max. 300 m<sup>2</sup> and minor modifications), the construction and expansion of buildings in Hungary can only be started with a final building permit.

The procedure is based on the General Administrative Procedure Code on Building Administration [86].

The evaluation process is based mainly on the Building Act [87], the Building Code [88] and local building codes [89], [90], also there are several law decrees [91], which regulate specific matters.

### 5.9.2 Organisation

General construction authorities, which are the government offices of the capital and at our 19 counties.

### 5.9.3 Technological system

Applications for building permits shall be submitted digitally through the electronic documentation site – that is a complex system for building related procedures that enables electronic application and plan submission, as well as electronic case management in construction authority permitting procedures or on a physical media device as well. However, plans of the building are generally submitted as pdf-files and manually reviewed by building permit officers. In the close future BIM related formats shall be required for larger and/or Government funded investments.

### 5.9.4 Procedural system

Architectural and technical documentation, to a quality that is specified by the Building Act, has to be submitted with the opinion of the mayor of the relevant local government on the town plan – where applicable. The consents from relevant professional authorities shall be needed as well during the process. The number and types of consents depend on the type of the project (cultural heritage protection, water and flood protection, accordance with municipal spatial plan). There is also a submission fee levied.

The detail of the construction plans is not high. The more detailed documentation is required by the Building Act later, before the construction takes place, and can be checked by the inspection. The official at the administrative unit reviews the documentation and all the consents. In case anything is missing, the applicant is contacted and asked to provide additional documentation that is required.

The authority conducts an on-site inspection during which evaluates all necessary circumstances, the fulfilment of technical, safety and legal requirements. Also, the documentation is evaluated. If all approved, the building permit can be issued in the electronic building system. It is possible to turn to the court regarding the final decision.

## **5.10 Italy**

### 5.10.1 Legislative system

The regulatory environment for the issuance of a building permit in Italy is covered mainly by national law, regional laws, and especially municipal regulations. At the national level, the normative reference document is the Testo Unico dell' Edilizia [92], which provides the basic and general principles for regulating building activity in Italy. This text has been updated several times over the years, and regulates the different permits required depending on the building work, including the building permit. At the local level, each building permit authority has its own General Regulatory Plan (PRG – *Piano Regolatore Generale*) [93], an urban planning document. This document establishes, at the general level, guidelines for land management and urban construction and development at the municipal level. The PRG contains Technical Implementation Regulations [94] (NTA - *Norme Tecniche Attuative*) that provide clear and specific directions to be followed in order to ensure proper application of

the regulations and consistency with municipal urban planning objectives. NTAs define, for example, land use zones, building density parameters, maximum building heights, minimum distances from boundaries, and other technical provisions. It is also important to note that in Italy, each building permit authority has its own Building Regulations [95] (*Regolamento Edilizio*). Building Regulation is a technical-administrative document consisting of a set of municipal regulations designed to regulate building activities from the procedural, aesthetic, sanitary and technical aspects. The Building Regulations list the permitted construction work, the required documentation, how to carry it out, the conditions of issuance for construction procedures, the criteria for conducting the work, and the execution of inspections.

#### 5.10.2 Organisation

Based on the dispositions of the *Testo Unico dell'Edilizia*, the Counter Service for Construction. (SUE - *Sportello Unico per l'Edilizia*) [96] was established. This is a service provided by each building permit authority with the aim of acting as an intermediary between the private citizen and public administrations. The main purpose is to simplify and speed up administrative procedures regarding construction by providing an access point for the submission of applications, and related documents. Through the SUE, applicants can obtain information and submit applications for planning permission. The SUE also coordinates the activities of the authorities (external – internal) and offices responsible for issuing the statements and certifications required to initiate and complete applications.

In Italy, the issuance of building permits is handled by municipalities. It is important to note that the specific organizations and office titles may vary from building permit authority to building permit authority. Usually, multiple figures and offices within the building permit authority are involved. In general, the Technical/Urban Planning Office is the department involved in the process of managing building practices. This is an office consisting of inspectors generally coordinated by Office Director. Individual files are generally followed by a single inspector from start to finish and then approved within internal office meetings. The inspector in charge of the file communicates with a range of external or internal agencies to exchange documents and requests for statements needed to complete the examination and make a final decision. The Director is the one who signs every document before the permit is issued. The Technical Office is usually supported by an office that handles the administrative-legal, bureaucratic and payment management aspects.

#### 5.10.3 Technological system

In Italy, paper-based application submission has been abandoned. The application is submitted digitally on the SUE-portal and through which it is possible to monitor the progress of the application and make any additions to the documentation when required. Integrating the portal into processes aims to simplify procedures, reduce time and improve system transparency.

#### 5.10.4 Procedural system

To submit the application, it must be done by a licensed engineer, architect or surveyor. Once the applicant submits the application within the portal, the building permit authority proceeds to register it. Before starting with the content review, it is checked whether the file has all the necessary elements to start the process. If essential elements are missing, the inadmissibility



of the file is notified; otherwise, if it is complete, a notice of initiation of proceedings is sent. Usually, the examination of the file is assigned to a single inspector who is responsible for checking the technical and urban planning aspects in accordance with the relevant regulatory documents.

By law, the person responsible for examining the application must be notified to the applicant within 10 days of submission.

During the examination phase, the instructor may make any requests or changes to the applicant. In parallel with the examination of the application, the instructor is responsible for acquiring from internal/external bodies the necessary statements to proceed with the issuance of the building permit. Usually, the applicant in order to speed up the process takes care to independently seek statements from outside agencies and submit them along with the application. Statements can be constraining or negotiable. Generally, the final decision is shared and discussed with internal office meetings and then communicated on the portal. In general, the maximum time to process the final decision is 60 days, however this may decrease as a result of regional laws. The actual permit is issued after the applicant makes the required payments. The building permit, once issued, has a limited time validity, generally expiring within 3 years if construction work is not started.

## **5.11 Lithuania**

### 5.11.1 Legislative system

The regulatory governing the issuance of building permits in the Republic of Lithuania is outlined in the Law on the Amendment of the Law on Construction, dated 19 March 1996, No. I-1240. This legislation establishes the fundamental principles for overseeing construction activities in Lithuania. It defines the various permits necessary for different types of construction work, such as construction work, reconstruction, repair of new construction works, acceptance as fit for use, demolition of such construction works. Additionally, it outlines the procedures for supervising these activities, the roles of stakeholders in the construction process, and the responsibilities of central and local government entities in this domain, including the issuance of building permits.

### 5.11.2 Organisation

In Lithuania, the issuance of building permits is overseen by the building permit department within municipalities. Initially, the administration department conducts a formal review of submitted documents. Subsequently, the mandate and various inspection agencies review the application in accordance with the detailed development plan.

### 5.11.3 Technological system

The application for building permits can be digitally submitted via infostatyba.lt on the Official Vilnius Website, under the supervision of the VTPSI State Territorial Planning and Construction Inspectorate. Notifications of building permit approval or denial also occur through infostatyba.lt.

#### 5.11.4 Procedural system

Upon submission of the building permit application to the building permit authority, the administration department conducts a completeness check to ensure all necessary documents are included. If any items are found to be missing, the applicant is notified and requested to provide the required additional documentation. Once all documents are gathered, they are forwarded to the mandate and all inspecting institutions for further review. Following this, the application undergoes scrutiny by special interests to ensure compliance with relevant laws and regulations. Permitting officers assess the validity of the documents and project documentation during the approval process. Additionally, the permit department obtains all required consents from relevant institutions and notifies neighbours and the applicant through infostatyba.lt.

### **5.12 Montenegro**

#### 5.12.1 Legislative system

The building permitting system in Montenegro is regulated by the Law on spatial planning and construction of structures [97], [98], [99], [100] (the amendment of which was initiated a year ago). This Act provides classification of buildings on three general types. For all building types, the procedures defined by legal acts are within the competence of state authorities (Ministry of Ecology, Spatial Planning and Urbanism), and some tasks and procedures are transferred to municipalities and their administrative bodies by special regulations [101]. The planning documents in Montenegro are The Spatial Plan of Montenegro and the General Regulation Plan of Montenegro, both are adopted by the Parliament of Montenegro.

Apart from this basic law, the law on administrative procedure [102], as well as laws in the field of environmental protection [103], the law on construction products [104], etc., also apply.

#### 5.12.2 Organisation

In Montenegro, the procedures for issuing building permits are managed by the Department for urban and construction supervision in the Directorate for inspection supervision. The Directorate is an organizational part of the Ministry of Ecology, Spatial Planning and Urbanism. The Department for urban and construction supervision is territorially organized: it has 9 sections, 3 for each region of Montenegro, with each section covering the area of more than one building permit authority, except for the capital Podgorica. The number of inspectors mainly depends on the number of inhabitants, or the area of the municipality, and ranges from 1 to 9. There are a total of 35 inspectors in the Department for urban and construction supervision, and 9 inspector-coordinators, although the organizational documents provide for a total of 54 inspectors and 9 inspector coordinators.

#### 5.12.3 Technological system

From the perspective of digitalisation, the building permitting system in Montenegro is not (yet) digitised. The submission of the building permit application can be digital, but the accompanying documentation for review has to be delivered in physical form. In the process of reviewing, some digital tools are used, for example official databases and portals for cadastre [105], land registry [106] etc.



#### 5.12.4 Procedural system

Procedures related to the issuance of a building permit depend on the type of building. Only for a special group of buildings "complex engineering buildings (structures)" is it required to obtain a formal construction permit. For other objects ("buildings and engineering structures") the procedure is simpler and involves fewer steps, and the law does not require the formal issuance of a building permit. In this case, the Law requires the submission of "notification of building work" to the Department for urban and construction supervision. This notification also involves the submission of certain documentation that the investor wishing to build must provide. Parts of this documentation must be previously formally controlled/approved by municipal administrative bodies, state authorities, or other participants, such as project reviewers [107].

Before submission of the application, the documentation specified by the Law has to be prepared. The detail of the construction plans (technical documentation) is the highest (main design) and those plans must be reviewed by a licensed reviewer before submission of application. During the review process, the reviewer must request all the necessary consents from various agencies prior to the make reviewer report. The number and types of consents depend on the type of the building.

The official (inspector) at the section of the Department for urban and construction supervision reviews the documentation submitted with "notification of building work". The inspector has a deadline of 15 days to check the documentation and issue a report. If it is determined upon checking that everything is in accordance with the law, the report has been positive, and the applicant can start construction after these 15 days from the application. However, if it is determined that the application does not meet any or some criteria, the Department will inform the applicant in the form of instructions, resolutions, or decisions regarding the supplementation of documentation or the prohibition of construction in the final case. If the inspector does not submit a report within 15 days of receiving the application, it is considered "silence of the administration", and the investor/applicant has the right to start construction.

### **5.13 Netherlands**

#### 5.13.1 Legislative system

In the Netherlands, the building permitting process is primarily regulated by law under the ministry of Interior and Kingdom relations (BZK) with process rules and technical requirements in the new Environmental code (Omgevingswet) [108] which will come into effect on January 1 2024. The specific technical performance requirements such as constructive safety, energy efficiency, accessibility, fire safety, noise and daylight, are specified in Decree on constructionworks living environment (Besluit bouwwerken leefomgeving) [109].

#### 5.13.2 Organisation

In the Netherlands, building permits are handled by the construction and housing supervision department at the 342 municipalities. The Construction and Housing Supervision Department works closely with the Spatial Planning department. The granting of a building permit is the authority of the mayor and aldermen but is often delegated to the department. The technical regulations have been established nationally and a municipality may not deviate from that.



Spatial rules are arranged locally in the environmental plan. The building permit officer reviews the application against the detailed development plan (if the application is within planned areas), the more building technical building regulations are checked by a building inspector. From January 1, 2024, part of the construction works will be tested private and will be monitored private by a quality assuranceer that hires the client [110].

### 5.13.3 Technological system

Applications for building permits can be submitted digitally by the Digital System Environment Act, but the building permit system is far from fully digital. Drawings of the planned building (floor plans, facade drawings etc.) as well as the situation plan, are generally submitted as pdf-files and manually reviewed by building permit officers. In the Netherlands there are intentions and already tests to be able to test more in BIM.

### 5.13.4 Procedural system

When the building permit application is submitted to the building permit authority, a completeness check is done to see if all required documents are included in the application. If all documents are included, a building permit officer is assigned to the case and reviews the application against the detailed development plan. The spatial rules, the aesthetic rules and the technical rules are then tested. Once the building permit is granted the applicant must report the start of the construction. Depending on the size of the construction project, the building permit authority must define and check the construction site. When checking and supervision, the building permit authority uses a certain risk assessment in which fire safety and structural safety always have a high priority. This will also take place through private quality assurance (for more standard buildings), whereby this private quality assurance company only deals with the technical quality of the structure.

## **5.14 North Macedonia**

### 5.14.1 Legislative system

The building permitting system in North Macedonia is regulated by Law on Construction [111] and other related laws. The Law on Construction among other, regulates: the basic requirements that buildings need to satisfy; defines the participants in the building process and their responsibilities; the project documentation; building permit process, etc.

Law on Construction also refers to other laws and bylaws such as: Law on Urban Planning [112]; Law on Construction Land [113]; Law on Energy Efficiency [114]; Law on Energy [115]; Rulebook on standards and normative for design [116]; Rulebook on procedures for obtaining a building permit electronically [117]; Rulebook on the content of the projects, annotation, method of verification of the project by the persons responsible and method of usage of digital signatures [118].

### 5.14.2 Organisation

Building permits in Republic of North Macedonia are organized on two levels: state and municipal level. Body in charge of building permits on state level is Ministry of Transport and Communications, while on municipal level, each municipality is responsible for granting



building permits for buildings within their territory. Exception of this division are the buildings that are constructed in the technological industrial development zones established by the Government of the Republic of North Macedonia, where building permits are issued by the Directorate for Technological Industrial Development Zones.

This division is logical, since Law on Construction categorize the buildings in two categories: A and B based on their complexity, importance, etc. This categorization determines who handles the building permitting process.

The first category buildings are buildings with significant importance for the Republic, such as nuclear, thermal, or hydro power plants, railways, highways, airports, industrial buildings in the technological process of which hazardous waste, governmental buildings etc. The second category buildings referred to in Article 57 of this Law shall be constructions of local significance such as buildings for primary and secondary education, cultural, religious, commercial, and residential buildings etc.

Building permitting is carried by building permit officers, that are employees of the departments in the Municipalities or Ministry of transport and communications.

#### 5.14.3 Technological system

Since 2013, building permitting procedures in North Macedonia are almost fully digitalized. All building permit applications are handled through “e-gradezna dozvola” [119] (e-building permit) web portal, along with all supporting documents in pdf or dwg file format. All processes and communication between the participants are going through the web portal. Exception from this is couple of processes, such as contract signing, payment of the taxes, notification to the neighbours etc. Reviewing process of the project documentation by the permit officers is done with external digital tools. All documents and processes must be digitally signed by the responsible persons and/or companies.

The “e-building permit” portal is being administered by the Association of the units of local self-government of the Republic of North Macedonia.

#### 5.14.4 Procedural system

The procedure for building permit starts with obtaining all required input documents (stipulated by law) and preparing of project documentation. When ready, applicant is applying through the e-construction permit portal, filling the required data, and attaching the required documentation. The portal is automatically notifying the relevant person and institution that application has been submitted. Permitting officers then check the documents and project documentation for their validity and compliance to the provision from the relevant laws and bylaws. If errors of any kind are spotted, applicant is notified for action via the portal system. In the process for approval, permit officers are collecting all required consents from all relevant institution and are notifying the neighbours. Procedures are the same for the first and second category buildings.

## 5.15 Portugal

### 5.15.1 Legislative system

The building permitting system in Portugal is regulated primarily by the Legal Framework for Urbanisation and Building (*Regime Jurídico da Urbanização e Edificação (RJUE)* [120]) and by the General Regulation on Urban Buildings (*Regulamento Geral das Edificações Urbanas (RGEU)* [121]). The laws and regulations that a design needs to obey are very fragmented and go from national laws to municipality regulations and Urban plans. Depending on the size of the municipality the number of laws and regulations can go up to 70. Regarding urban planning, the main mechanism is the Municipal Master Plan (*Plano Director Municipal (PDM)* [122] [123]) which specifies in each municipality the zones and constraints related to protection areas, construction areas, types of uses in buildings allowed, etc. If an urbanization plan has already been approved in a specific area, the design of the building needs to comply also with the plan.

### 5.15.2 Organisation

In Portugal, the procedures for issuing building permits are handled by the building permit department at the municipalities which commonly is part of the urban planning office together with planning, surveying and GIS departments. There are 308 municipalities with a big variation in the size and number of employees, depending on the size of the territory and population. The permit is issued by the head of the building permit department after analysing the report issued by the assigned technicians that analyse all documentation submitted by the applicant. After the first permit (to build the building), before starting the construction, the applicant needs to submit a request for a construction permit with the details about the contractor. After the construction, the applicant needs to request a final permit that validates that the building is according to the submitted design.

### 5.15.3 Technological system

From the perspective of digitalisation, the building permitting system in Portugal is already digitised in many municipalities, but not all.

In the process of reviewing, some digital tools are used, for example, official databases and portals for cadastre, land registry etc. Even if the process is digitised, the requested elements are still relying on 2D drawings and pdf documents with complementary information, requiring all verifications to be performed manually by a technician.

### 5.15.4 Procedural system

To submit the application, it must be done by a licensed engineer or architect depending on the discipline of the project. There are two different tracks that an applicant can follow to get a building permit: (i) submit the full design of the building to get the building permit and then start the construction; (ii) submit a request through the preliminary information procedure (*procedimento de informação prévia*) where the construction can start without the validation of the design by the local authority. In this last process, the building design is analysed along

the construction process by the building permit authority and the building permit is issued at the end of the construction.

In both cases, according to the national law, the building permit requests the approval of the architectural design (both in terms of exterior architecture, building areas and accessibilities) and a formal analysis only of the other disciplines (structural design, water supply design, water drainage design, thermal design, acoustic design, electrical design, etc.). In this formal analysis, a licenced engineer needs to issue a liability statement for the design. To submit a request it is requested the following documents that can vary depending on the size, complexity and type of project: Administrative forms (pdf), Owner and applicant documents (digital format), Pictures of the plot (digital format), Report with urbanistic parameters (pdf), Site / Land documents (digital), Accessibility plan (pdf, dwg), Architectural design (pdf, dwg), Site Plan 1:5000 (pdf, dwg), MEP project Structural project, Report with the description of project and materials (pdf), Topographical survey 1:500 (pdf, dwg), Urban Plan 1:1000 (pdf, dwg), Topographical survey 1:500 (pdf, dwg), Certificate for sound acoustics (pdf) Construction info - Schedule and budget (pdf), Additional required documents.

## **5.16 Romania**

### 5.16.1 Legislative system

At the moment, the building permitting system in Romania is regulated by several laws and regulations, such as Law 50/1991 [124] and Law 350/2001 [125]. These regulations provide categorization of buildings and set requirements and conditions for each building type. The building permits are subject to national-level regulations, yet they are issued on a local level. However, the recently proposed Building Code is currently under discussion and is expected to receive approval in short time. In the Building Code there will be all the regulations and all the building permit legislation grouped, and it will be called the Building Permit Code. This will serve as the national regulation.

### 5.16.2 Organisation

In Romania, the procedures for issuing the building permits are managed by the General Directorate for Urban and Spatial Planning or the Directorate of Urban Planning, which in substance has the same name all over the country. The department is divided into the department of the urban planning certificates, the departments of the building permits, as well as the urban database, which has the necessary data and does the registration of buildings. Subsequently, there is the department of zoning plans and detailed urban plans, which represent the basis of the urban planning documentation that underlies the issuance of building permits.

### 5.16.3 Technological system

In terms of technology, Romania has not yet adapted a fully digitized system. The submission of the building permit application is physical, as well as the documentation for review. There are several digital tools that are used at the moment, such as portals for cadastres, land registry etc.

#### 5.16.4 Procedural system

The procedural system is carried out according to the current legislation. First, the urban planning certificate is issued, which is submitted by the architect, as the manager of the project. The urban planning certificate is designated to give the conditions under which the building permit can be obtained. These can represent the necessary permits, and all the regulations regarding the location of the building on the plot and the building regulations. After the stage of the urban planning certificate, will involve drafting the project and preparing the necessary documentation for authorization process.

All the procedure for authorizing a construction is described in Law 50/1991 and Law 350/2001, which tells what documents are required and how a building permit can be issued depending on the type of construction. These activities are conducted locally for the building permit authority of each area, certainly there is the county council, at the level of the mayor's office it is issued there, and at the level of the communes, where they have organized this activity, because there are smaller communes that have not organized the activity of issuing permits. In this case the permits are issued at county level.

### **5.17 Slovenia**

#### 5.17.1 Legislative system

The building permitting system in Slovenia is regulated primarily by the Building Act [126]. Among other matter related to construction, the Building Act provides classification of buildings and defines the requirements and conditions for each group of buildings. There are several regulations, linked to the Building Act, which regulate specific matters (energy performance, documentation etc.). The building permit processes are primarily regulated by the General Administrative Procedure Act [127], which regulates all official processes in Slovenia. Spatial planning is regulated by Spatial Management Act [128].

In Slovenia, the municipalities carry the primary responsibility for spatial planning. Municipal spatial plans cover all the Slovenia's territory and define general rules for construction and other interventions in the environment. The second, superior level for spatial planning, is national level. National spatial plans are prepared for larger projects with national importance.

#### 5.17.2 Organisation

In Slovenia, the procedures for issuing building permits are managed by administrative units, not municipalities as in most countries. There are 58 administrative units compared to 212 municipalities, which means that they usually cover the area of more than one municipality. The size in terms of numbers of employees and departments highly depends on the size of the territory and population density. The administrative unit Ljubljana (capital of Slovenia) is the largest and has a dedicated sector for environment (45 employees) which is responsible for building permitting. The smallest administrative units do not have dedicated sectors for environment and only 2 or 3 employees that work on building permitting.

### 5.17.3 Technological system

From the perspective of digitalisation, the building permitting system in Slovenia is not yet digitized. The submission of the building permit application can be digital, but the accompanying documentation for review has to be delivered in physical form. In the process of reviewing, some digital tools are used, for example official databases and portals for cadastre, land registry etc.

### 5.17.4 Procedural system

Before submission of the application, the documentation, that is specified by the Building Act has to be prepared. The applicant has to acquire all the consents from various agencies prior to the submission. The number and types of consents depend on the type of the project (cultural heritage protection, water and flood protection, accordance with municipal spatial plan). The detail of the construction plans is not high. The more detailed documentation is required by the Building Act later, before the construction takes place, and can be checked by the inspection. The official at the administrative unit reviews the documentation and all the consents. In case anything is missing, the applicant is contacted and asked to provide additional documentation that is required.

## **5.18 Sweden**

### 5.18.1 Legislative system

In Sweden, the building permitting process is primarily regulated by the Planning and Building Act [129] (Plan och Bygglagen; PBL) with more technical regulations such as accessibility, fire safety, noise and daylight, are specified in the technical building regulations [130] (Boverkets Byggregler; BBR).

### 5.18.2 Organisation

In Sweden, building permits are handled by the building permit department at the municipalities which commonly is part of the urban planning office together with planning, surveying and GIS departments. Building permits are granted by the building committee (political) but there is often a delegation to building permit officers to grant building permits without involving the committee. How much that is delegated to the building permit officers varies between municipalities. The building permit officer reviews the application against the detailed development plan (if the application is within planned areas). The more building technical regulations are checked by a building inspector also at the building permit department.

### 5.18.3 Technological system

Applications for building permits can be submitted digitally, but the building permit system is far from fully digital. Drawings of the planned building (floor plans, facade drawings etc.) as well as the situation plan, are generally submitted as pdf-files and manually reviewed by building permit officers.

#### 5.18.4 Procedural system

When the building permit application is submitted to the building permit authority, a completeness check is done to see if all required documents are included in the application. This is usually done in a group, including administrator, building permit officer, and building inspector, at the building permit department. If all documents are included, a building permit officer is assigned to the case and reviews the application against the detailed development plan. The officer also handles referrals (internal within the building permit authority and external) that are required. Once the building permit is granted the applicant needs to get a starting clearance before the construction can start. That is handled by a building inspector at the building permit department that checks the more technical building regulations according to BBR. How much of the technical regulations that are checked in parallel with the review according to the detailed development plan and how much that is checked after the building permit is granted as part of the technical consultation differs between municipalities.

### **5.19 United Kingdom**

#### 5.19.1 Legislative system

The building permitting system in the United Kingdom is devolved to the four nations, England, Wales, Scotland, and Northern Ireland. By far the largest is England. Building permitting is divided between the Planning system which covers land-use zoning and structure planning including public consultation, and the Building control system which covers the technical regulation.

Parliament passes the primary legislation such as the Building Act 1984 [131]. The relevant Government department, Department for Levelling Up, Communities and Housing (DLUCH) issues secondary legislation including the 'Building Regulations' [132] and guidance such as the 'Approved Documents' [133]. Solutions equal or better than those found in the Approved Documents can be submitted.

#### 5.19.2 Organisation

Both the planning and building control systems are administered in England by 333 Local Authorities which can be based on city or regional divisions: there are 32 London boroughs, 24 county councils, 181 district councils, 36 metropolitan districts, 58 unitary authorities and the 'City of London' which has its own privileges.

#### 5.19.3 Technological system

The planning system is more digitalised than the building control system. A single online 'planning portal' collects applications using online forms or accepting PDF forms, accepting documentation and fees, and identifying the relevant site and authority through interactive access to GIS mapping databases. There are some local authorities developing web-pages with rule-based structured guidance to simplify the system and reduce the number of invalid applications. The building control system still accepts paper submissions though the majority of applications are submitted as pdf documents.

#### 5.19.4 Procedural system

Focussing on the building control system, there is a choice of using a private-sector building control service or making the application directly to the local authority. An applicant can either submit a full application, with pdf drawings, or submit a 'building notice', creating an application at an early date but postponing submission of detailed drawings. Applications are checked for completeness and for payment of the correct fee. The technical checks and the mandatory consultations with the fire authority are commenced in parallel. If the application comes within 3m of any existing sewer, then the local sewer authority must also be consulted. Issues can be referred back to the applicant asking for a revised set of plans.

If the application is given 'Plan approval', then a process of 6-7 construction site inspections is initiated culminating in the issue of a 'Completion Certificate' which may be referred to in the builders contract to release half of the retention sum. The owner may need to produce the 'Completion certificate' when selling or letting the building.

### **6. REPRESENTING EUROPEAN BUILDING PERMIT PROCESSES**

#### **6.1 Austria**

The authorisation process in Austria is a structured procedure that is required for the approval of various types of projects, activities, or applications. In Austria, there are several procedures for obtaining a building permit, including the building notification, construction notification and the building permit procedure, which are regulated in the respective building regulations of the nine federal states.

This process can vary depending on the type of permit and the competent authority, but generally follows certain basic steps. Here is a general description of the authorisation process in Austria. Pre-application meeting: a meeting may also be held with the building authorities prior to the actual building application in order to clarify certain issues in advance. Application: The process usually begins with the submission of an application to the competent authority. The application must usually include a submission plan, energy certificate and a building description with detailed information about the project for which authorisation is being sought.

Checking the documents: Once the application has been submitted, the authority checks that the documents submitted are complete and correct. Additional information or documents may be requested in order to make an informed decision. In most cases, a check is also carried out at this stage to determine whether the property has already been declared a building site.

Full examination: The building application is usually examined separately according to technical and legal criteria. Technical building criteria are generally formulated as everything that deals with the building itself (fire protection, lighting, hygiene, etc.) and are regulated nationwide by the OIB guidelines. During the building law inspection, the suitability for building is checked (building height, distances etc. In some cases, the authority must call in external experts or consultants from other areas.

Public notice and objections: After successful submission, neighbours have the right to inspect the application. This gives them the opportunity to inspect the application and raise any objections. This is followed by a construction hearing with all parties involved in the process.



Decision-making: After the assessment, the authority makes a decision on the application. This decision can be an authorisation, an authorisation with conditions or a rejection.

Notification of the decision: The applicant is informed of the decision. In the case of an authorisation, specific conditions or requirements may be set which the applicant must fulfil.

Appeal: If the application is rejected or the applicant does not agree with the conditions, it is usually possible to lodge an appeal. This may include an appeal to the Administrative Court.

Monitoring and compliance: Once the licence has been granted, the authority monitors compliance with the conditions and requirements. Violations can lead to sanctions or withdrawal of the authorisation.

Finally, a notification of completion is submitted to the authorities, see figure 4.

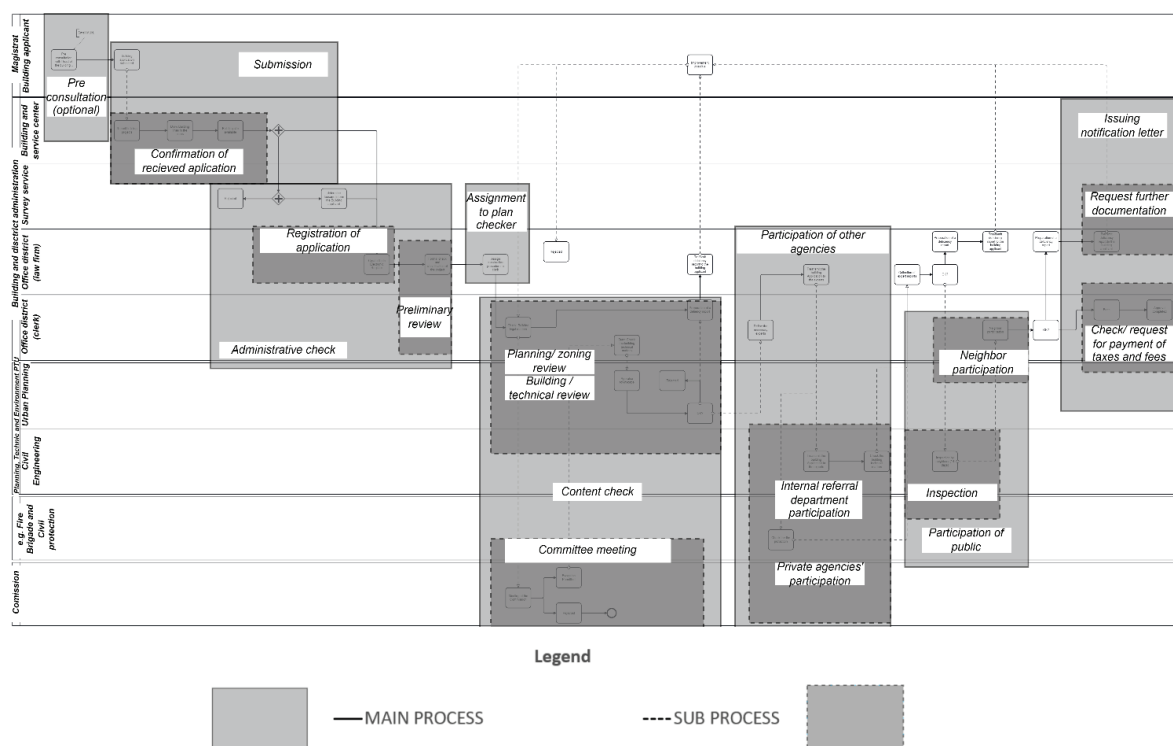


Figure 4: BPMN Diagram of Building Permit Process in Austria

## 6.2 Belgium (region of Flanders)

Typically, property developers hire an architect to design a building and, once approved, the architect prepares the documents required to apply for a building permit. For minor changes to residential buildings, the owner may apply for a permit himself, e.g. to install solar panels, build a small construction in the garden, etc.

As illustrated in figure 5, the act of submitting a building permit application is completely digital, at least as far as the general information is concerned. Graphical documentation can still be submitted on paper, although this is discouraged. The building permit application is submitted to the regional authority, which forwards it to the relevant building permit authority. A member of the administrative staff will then enter the application into the building permit authority's procedure system, of which the applicant will be notified. The application is then assigned to a building permit officer. Depending on the size of the

municipality, the assignment is organised thematically in the case of a large city, or simply geographically if the project is located in small to medium-sized municipalities. Together with the administrative staff, the building officer carries out a completeness check, thereby validating the submitted documents from a formal point of view. If an item of information is missing, the applicant will receive a request to complete the missing information. If complete, the procedure starts, and the applicant is notified.

At this point, the application gets publicly visible as well online as on site and three groups start to review the application: experts within the building permit authority, experts from external agencies and finally the public in general. Within the building permit authority, several people will assess the application: the building officer will check the application against existing town planning regulations, the fire brigade will look at fire safety issues, and an environmental expert may be involved, etc.

At regional level, more specialised bodies will examine the application: Heritage, Nature Conservation, the Agricultural Department, the Infrastructure Department, the companies responsible for energy distribution, etc. Finally, the public is given the opportunity to comment, although this is generally limited to people who have a close relationship with the project, i.e. the neighbours. In the case of a large project with a huge impact, the public as a whole is involved.

This process is supported by software provided by the regional authority that distributes and communicates the assessments and the results obtained, emails are sent throughout the process. For each advice published, the building permit officer collects the comments and communicates them to the applicant. The applicant is thus informed of the progress made.

All assessments must be completed within a specified time, depending on the project between 60 and 120 days. Once these have been completed, the building permit officer will summarise the results in an approval report and provide a final recommendation, whether positive, conditional positive, or negative. This advice is not legally binding, the final decision rests with the City Council. It is the mayor's signature that makes the outcome a legally binding fact. Most evidently, the applicant gets notified about the decision. This is the start of a 30-day period for appealing against the decision.

There is generally no requirement for a second permit to commence use of the building after completion, although there may be inspections by the building control officer, but these are usually limited to urban planning requirements.

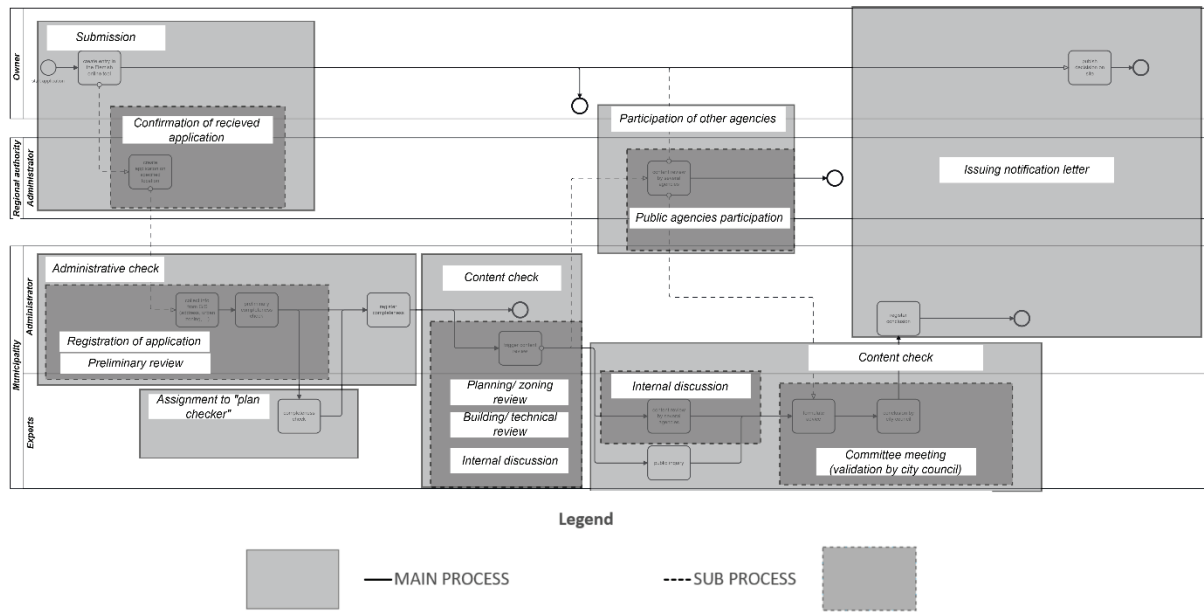


Figure 5: BPMN Diagram of Building Permit Process in Belgium

### 6.3 Czech Republic

There are several kinds of procedures in Czech Republic. According to the kind of the construction there can be a combination of environmental procedure, zoning procedure and construction procedure. The Building Act defines a set of buildings for which only a zoning procedure is sufficient. There is also a variant of using only the construction procedure in case the construction is intended in an area with a developed regulatory plan, which can replace the zoning decision according to the Building Act.

The latest amendments to the Building Act specify a combination of zoning and construction proceedings as the main procedure as one.

There is the list of the authorities concerned protect public interests according to special legal regulations and the Building Act and issue opinions.

As shown in Figure 6, the process itself usually starts with zoning procedure or as a connected zoning and construction procedures. The investor/owner – usually via designer’s company - can ask for a pre-consultation at the building permit authority, to see, if the municipal spatial plan allows for the planned construction. The investor shall secure the documentation specified in the Building Act and created by the designer and binding opinions or decisions of the concerned authorities or other documents according to special legal regulations.

The investor submits the application or appoints the designer to do it for him. The application form can be delivered electronically (with verified identity) and the documentation has to be delivered in paper form. The investor has to apply to the building authority that has jurisdiction over the land it is intended to build on. This is usually the building department of the municipal authority of a larger municipality. The standard content of the documentation for the construction procedure includes: A consent to the execution of a construction project; a zoning decision or a public law contract replacing the zoning decision or zoning consent, if their issuance is required by the Building Act and has not been issued by the building authority competent to permit the construction; binding opinions or decisions of the authorities

concerned or others pursuant to special legislation or the Building Act; opinions of the owners of public transport and technical infrastructure on the possibility and methods of connection; a project documentation prepared by the designer in duplicate, which includes an accompanying report, a summary technical report, situational drawings, documentation of buildings and technical and technological equipment and a documentary part, a draft plan of inspections of the construction.

As the first step the administrative check of the application is done. The assignment is partially territorial and partially content based. The building authority shall give notice of the commencement of the procedure and shall order an oral hearing to consider the application and, if appropriate, combine it with an on-site inspection; the officer may waive the oral hearing if it is familiar with the situation in the area and the application provides a sufficient basis for consideration. The officer checks chosen technical parameters or can ask for expert opinion, if needed. Objections from the parties and public comments must be submitted no later than the oral hearing. The building authority shall rule on objections on which there is no agreement between the parties, except objections relating to property rights. In the event of disagreement with the decision, the case is forwarded to the superior authority that is reviewing the case. The building authority assesses the compliance of the project with the requirements of Building Act. The building authority issues the building permit, after it becomes legally valid it sends the certified copy of the documentation and a label with the identification data of the building permit to the builder. The label must be prominently displayed on the site throughout the construction period.

An integral part of the implementation phase is the control of the construction process by providing on-site supervision. There are two main types of supervision:

Author's supervision, which is responsible for observing the main principles of the project and checking the compliance of the construction with the project documentation.

The builder's technical supervisor, who is the builder's representative and technical advisor, carries out inspection and supervision activities, participates in inspection days, checks the itemized budget and technological regulations.

If the construction activity required a building permit, the builder must apply for an approval procedure before starting to use the building. The approval decision assesses the compliance of the construction with the approved project in the construction procedure.

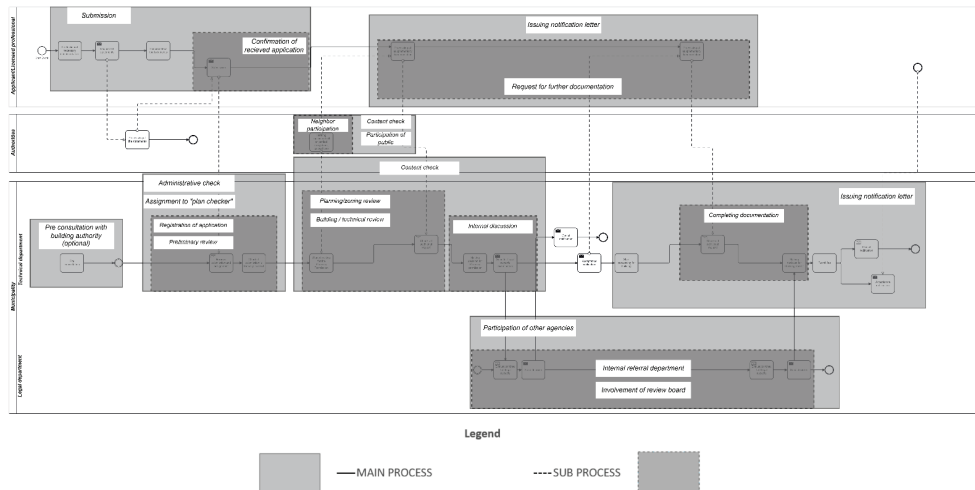


Figure 6: BPMN Diagram of Building Permit Process in Czech Republic

## 6.4 Denmark

The process begins with the submission of a building permit application by a citizen or developer. This application includes detailed plans, descriptions, and other necessary documentation, that demonstrate compliance with building regulations. submitted through a digital platform called “Building and Environment”, represented in Figure 7.

Once an application is received, a construction caseworker is assigned to handle the case. This involves a thorough review of the application against the legal framework, local plans, environmental considerations, and technical standards. The caseworkers may consult with other municipal departments for specialized input, such as environmental impacts or heritage preservation. The medium-sized municipality’s use of the “KMD Nova” system is an example of the technology supporting this process.

The consultation and assessment process may require consultations with neighbours, especially if the construction involves deviations from standard practices or local plans. For certain projects, especially those that significantly impact the local area, the building permit authority may involve neighbours and the public in the decision-making process. This involves notifying adjacent property owners and possibly conducting public consultations to gather feedback and address any concerns. In cases requiring exemptions or special permits, a broader consultation may be initiated, involving other citizens affected by the local plan.

The decision-making process is based on the assessment and consultations; a decision is made to either approve or reject the application. If the application is rejected, the applicant has the right to appeal the decision to the Planning Appeals board. If the application meets all requirements, the building permit authority issues the building permit. This permit outlines the conditions and specifications under which the construction must proceed. The applicant is responsible for ensuring that the construction adheres to these conditions.

Upon approval, the construction can commence. However, the building permit authority continues to oversee the project to ensure compliance with the approved plans and regulations. In some cases, additional documentation, or tests (e.g., energy performance certificates) is required upon completion of the construction. Throughout the construction phase, municipal inspectors may visit the site to ensure compliance with the building permit

and regulations. Any deviations from the approved plans must be communicated to the building permit authority and may require additional approvals.

Once the construction is completed, a final report is submitted from the applicant to the building permit authority for review. The report includes a statement of the construction meeting all the regulations and standards, if it meets the requirements a completion certificate is issued.

The process underscores the municipalities' commitment to sustainable and responsible urban development. While the process is comprehensive, it is also designed to be flexible, allowing for adaptations based on specific circumstances and technological advancements.

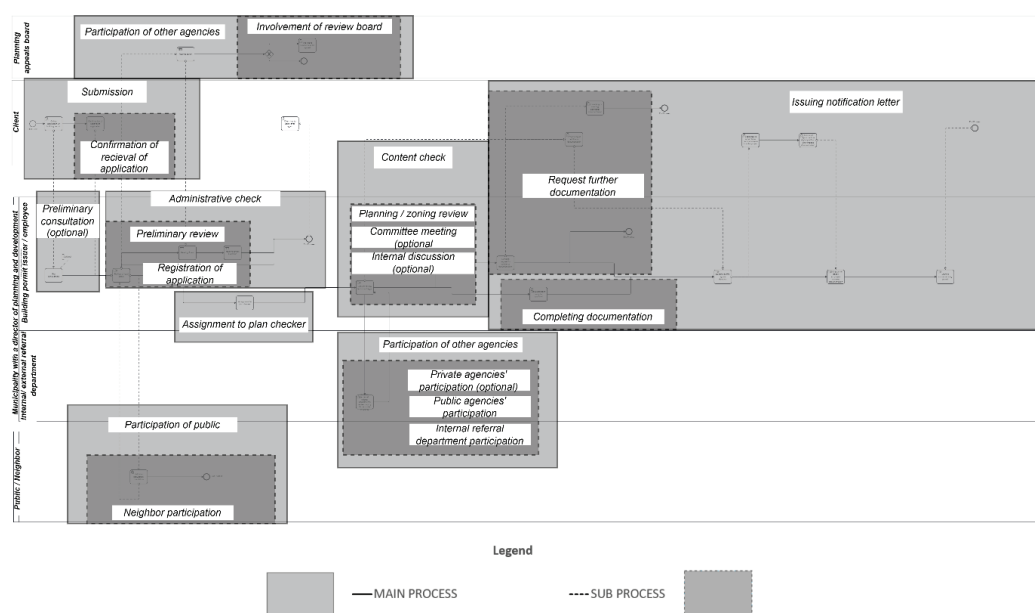


Figure 7: BPMN Diagram of Building Permit Process in Denmark

## 6.5 Estonia

First stage of building permit is creating construction design documents. In most cases investor/owner hires contractors to prepare the design and handle submission process, but for private houses it is possible for the owner to do this work him-/herself if they have enough competence (if owners want to build a single house for own usage, they do not have to possess architectural or engineering degree, but they must follow the requirements for construction design nevertheless).

In Estonia pre-consultation is possible by contacting local building permit authority, but it is not obligatory process in the building permitting and therefore, not described further in the process. In addition, local governments have guidelines on their website to make building permit application easier for the applicant. If applicants have a sketch, they can get feedback to it from local building permit authority. Technically it is possible to load not complete construction design documents (draft) to the Building Registry during the submission phase, but it is strongly not recommended by the local authority, because it prolongs permitting process. Construction design must be thought through and completed at least to preliminary design level before starting application. Requirements for preliminary design level are set by

construction design standard EVS 932:2017 and regulation Requirements for the construction project<sup>1</sup>.

In submission phase applicant (owner or some other person delegated by owner) have a decision either to do the submission fully digital in the Building Registry or to take construction design and all other necessary documents to local authority on paper (exception in the law), as shown in Figure 8. In any case permit process will be carried through in Building Registry procedural environment IT solution. If documents are on paper, then it is the task of the local authority to scan them in, upload to the Building Registry and insert data about the building(s) in the registry. Fee must be paid before submission.

When the application has been submitted, it reaches local authority. It varies by the building permit authority how application is directed further, but overall process is quite similar. In some municipalities there is a secretary that picks up the applications and directs them to permit processers, in other processers pick it up from their desktop according to their working procedure. In some municipalities the division of tasks is territorial, in others by the type of buildings on application.

Processor controls if application meets all requirements for example, if the fee is paid, correct permit type is selected, all the documents that are needed are presented, all technical data about the building is added to the Building Registry. If requirements are not met, processor can decide either to return document without reviewing (ends the permit process for this application) or to correct deficiencies. If deficiencies cannot be corrected, it ends the permit process for this application. Otherwise, applicant must correct deficiencies and resubmit the application. If all requirements are met, inspection phase begins.

If all requirements from last phase are met, inspection phase begins. Processor decides by the application which specialists within the building permit authority, which state authorities, which utility networks owners and who else to involve in the process. Invitations to join the process are sent through Building Registry cloud based permitting system.

Number of involved people and other authorities is largely depending on the size of municipality and type of the building. For example, in Tallinn 9 different specialists can be added only from Urban Planning Department, additionally 6 other local departments with their specialists can be involved. In smaller municipalities there can be only 3-5 specialists.

State authorities are not involved in all cases (except Fire Board), but regarding type of the building. Up to 7 state authorities can be included in the permitting process: Rescue Board, Health Board, Environmental Board and Transport Administration, Consumer Protection and Technical Regulatory Authority, Ministry of Defence and Agriculture and Food Board. State authorities are coordinating authorities and their remarks must be taken into account by the processing authority and applicant. All other involved parties in the permit process make their remarks as opinion and it is the task of local processing authority to decide which of these must be followed by applicant.

Utility network owners are added if their networks are in contact area of buildings on permit application. Their task is to provide technical conditions for connecting building to network and give their opinion about provided solution.

Neighbour(s) of the building, other interested parties (set by detail zoning plan, design conditions and Administrative Procedure Act) and the owner of the building if the owner is



not the applicant are also involved in the process. Processor of local authority decides who must be involved.

All who are added get a notification to their email address and a deadline of 10 calendar days to do their tasks. Everyone added review the application by their competence and make remarks in the Building Registry permit system, if there are any.

After remarks are made, processor looks them through and forwards all obligatory remarks (state authorities) and compiles other remarks (makes changes if there are controversies in the remarks or they are not made by the competence of the remark maker) and forwards them to applicant for correction. Applicant must correct the documents and send the application back to processor. This circle will continue until there are no remarks, all remarks are positive, or all remarks are met by the applicant. On average there are 3-4 rounds before all remarks have been corrected. In very rare cases for smaller building permits, there have been 2 rounds. Some applications last more than 10 rounds before everything is completely corrected. All requirements that fall under responsibility of local government must be checked comprehensively because of the Supreme Court's ruling, which states that the interpretation of any regulations in the permit procedure is the responsibility of the local government and cannot be put by the local government on the designer, because otherwise the permit procedure would be an unnecessary bureaucratic process.

If there are no remarks, all remarks are positive or all remarks are met by the applicant, the process will go to the decision phase.

During the decision phase, the processor of local building control authority prepares the building permit authorisation draft (administrative act draft) and sends it for signing. The signer of building permit varies in different municipalities. In some municipalities, it is the head of the department responsible for building permitting, whereas in some municipalities, it can be the City Council or Parish Council. The permit applicant may download the final permit (pdf) from the Building Registry.

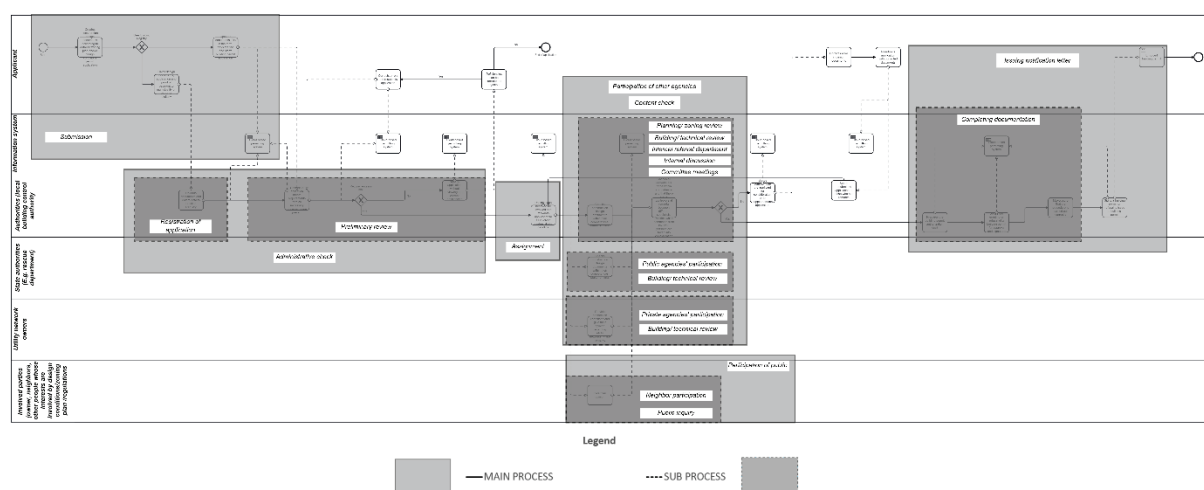


Figure 8: BPMN Diagram of Building Permit Process in Estonia

## 6.6 Finland

The different municipalities' permit processes vary across Finnish municipalities due to size differences. The following process describes big and mid-size cities, whereas the smaller municipalities' administrations and processes are simpler. The municipalities' permit processes also vary as they have their own building regulations and practices.

The Finnish permit processes are subject to change due to digitization. Currently nation-wide development projects aim at harmonizing the data structure and processes of building permitting. The Rava3Pro project is piloting IFC-model based permitting, allowing for automated delivery<sup>[OB]</sup> <sup>[OB]</sup>. In 2024, the new national built environment information system will be implemented in the RYHTI-project (<https://ym.fi/en/project-ryhti>). The new building code will enter into force in 2025. The national requirement is that the IFC model must be submitted with the building permit application, and the building control must be able to receive and archive IFC models as part of the permit process. The legislative renewal will also cause changes to the individual municipalities' building regulations.

**Preliminary process:** The Finnish permit procedure relies heavily on preliminary permit processing during the design phase of a building project, illustrated in Figure 9. The rationale behind the preliminary processing is to ensure that the plans are in accordance with the town plan and regulations and that the building is suited to its surroundings.

The building designer submits the documentation to the Permit Offices customer e-service at a draft stage. After submitting the draft documentation, the designer makes the application visible to the Permit Office in the e-service.

The permit secretary takes the application into a job queue and the permit processor is selected based on the city district, project size, and earlier contacts with the project.

The permit secretary makes the Formal review.

**Preliminary consultation 1 (cityscape)** is a starting meeting between the designer and the permit processors for starting the preliminary process. It focuses mainly on design initial data, zoning-related and cityscape aspects, and the degree of complexity to assess whether the project should be presented to committees inside the municipal administration.

**Preliminary Consultation 2 (technical)** between the designer and the permit processors addresses the technical designs if the design solutions are exceptionally demanding or deviate from established solutions.

In large cities, demanding projects are submitted for evaluation to District Development Group or to the Cityscape Committee.

**Review process:** If the considerations that have been brought up in the preliminary consultations have been made, and the designer has completed the documentation in the prescribed format, the review process can be quickly completed. The designer informs the permit processor when all application documents have been submitted and the actual review processing can begin. The application is marked as "complete" in the e-service.

An important part of the permit process is checking the designers' and commenting experts' competences. The competence check is essential because the permit processors can perform only random spot checks to due to their limited resources, and because of ensuring that the applicant has adequate expertise available for the project.

If necessary, statements on the permit application are sought from the Urban Planning Department, Public Works Department or the City Museum.

In large cities, demanding projects are submitted for review and formal statements to District Development Group. The Cityscape Committee examines the suitability of the project for the built environment and landscape, as well as its consistency with the town plan. The Technical Committee examines issues affecting safety and health, including structural and fire engineering solutions. If necessary, the Public Works Department’s permit engineer gives an opinion on street access and traffic arrangements.

Neighbours are consulted regarding the permit application, either by the applicant or by the city. Content review includes main drawings, fire code, compliance with the town plan, correct location, distance to neighbours, compliance with the city regulations, safety and energy regulations. Review of the statements in collaborative team sessions within the building control services, regional urban planning and with the political permit committee. Decision in the big city: The authority is with the processor up to 1,200 square meters. Projects exceeding 1,200 up to 5,000 are the responsibility of the team managers. Decision of 5,000 and up projects is made by the head of the unit.

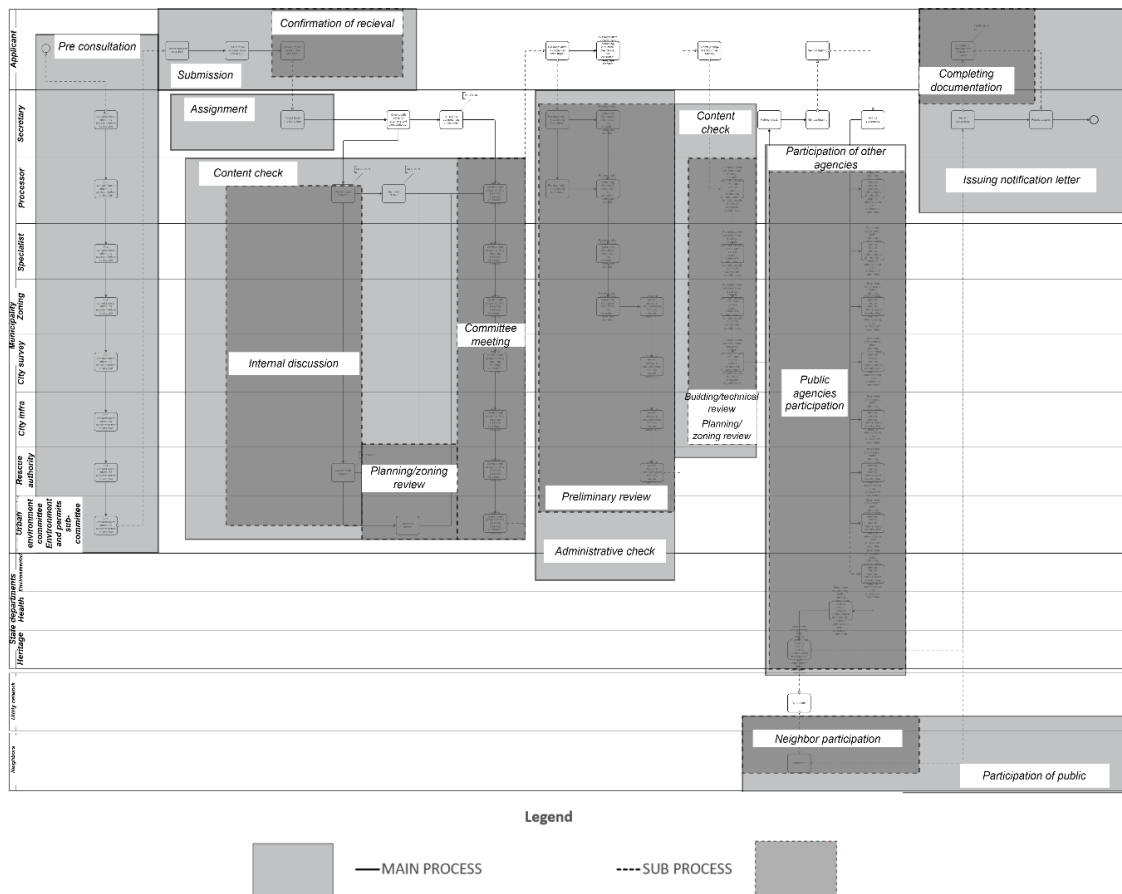


Figure 9: BPMN Diagram of Building Permit Process in Finland

## 6.7 France

Before submitting the Building Permit application, the documentation (application form, layouts, plans, studies) that is specified by the Planning Code<sup>1</sup>, is prepared by the Owner or a designer hired by the Owner (e.g. an Architect<sup>2</sup>).

The Building Permit Application is submitted to the building permit authority by the applicant (Owner or an authorised representative on behalf of the Owner, for example an Architect). Applications for building permits can be submitted digitally or on paper. Paper or digital submission is the choice of the applicant. In case of paper submission, the permit application must be submitted in several copies. The application in paper form can be sent by mail or delivered by hand to the town hall secretary.

The application is sent to the urban planning department of the building permit authority (or to the EPCI<sup>3</sup> when the building permit Competence is transferred or delegated to the EPCI), as illustrated in Figure 10. The application is registered in the authority's system and usually assigned to an appropriate officer from the urban planning department. The building permit authority issues a receipt and notifies the applicant of the processing deadline for the decision. Within 1 month from the date of submission of the permit application, the building permit authority may notify a different deadline to the applicant (due to the type or location of the building project).

Within 15 days following the permit application submission, a notice of submission of the building permit application specifying the essential characteristics of the project is posted at the town hall (for public information).

An administrative and completeness check is done by the officer to see if all required documents are included in the application, and if they contain all the information it should contain. In case of missing documents or information, the applicant is notified (within 1 month) that additional information or documents are requested. The applicant will prepare and submit missing documents or information within a maximum regulatory deadline (usually 3 months).

Once the permit application is deemed complete, the assigned building permit officer reviews and checks the content of the building permit application against the town planning document requirements.

In parallel, the officer also initiates the mandatory (and optional) consultations with various external agencies depending on the nature of the project and its location. For example, the Architecte des Bâtiments de France (ABF) is consulted for a project located in the perimeter of a building registered as a historic monument, the Departmental Advisory Commission for Safety and Accessibility is consulted in case of building open to the public, networks operators are consulted etc.

All the consulted agencies will review the permit application and issue opinions to the urban planning department.

Based on the opinions issued by the consulted agencies and the detailed review/check carried out by the officer, the latter prepares the final decision document (draft Order).

The permit is granted or refused by the mayor (or the competent authority where applicable). The decision takes the form of an Order signed by the mayor. This Order is sent to the

applicant by registered letter with acknowledgement of receipt or equivalent electronic means.

If there is no response from the mayor to the applicant at the end of the permit application period (deadline varies according to the authorization requested and the project location), the project is presumed accepted. This is known as tacit building permit.

If the building permit application is refused by the Mayor, the Owner can contest the decision within 2 months following the date of notification. If this appeal fails, the Owner has a further period of 2 months to appeal to the administrative court.

Once the building permit is granted, the applicant must display the permit on construction site, in the form of a notice board including the permit number, and throughout the construction period. For 2 months from the first day the permit is displayed on construction site, neighbours can contest the permit granted (appeal to the mayor who granted the permit).

Once the building permit is granted, the building permit authority must display the permit in the town hall within 8 days from the issuance of the permit.

Before starting work, the Owner must notify the start of the works on a form to be sent to the building permit authority.

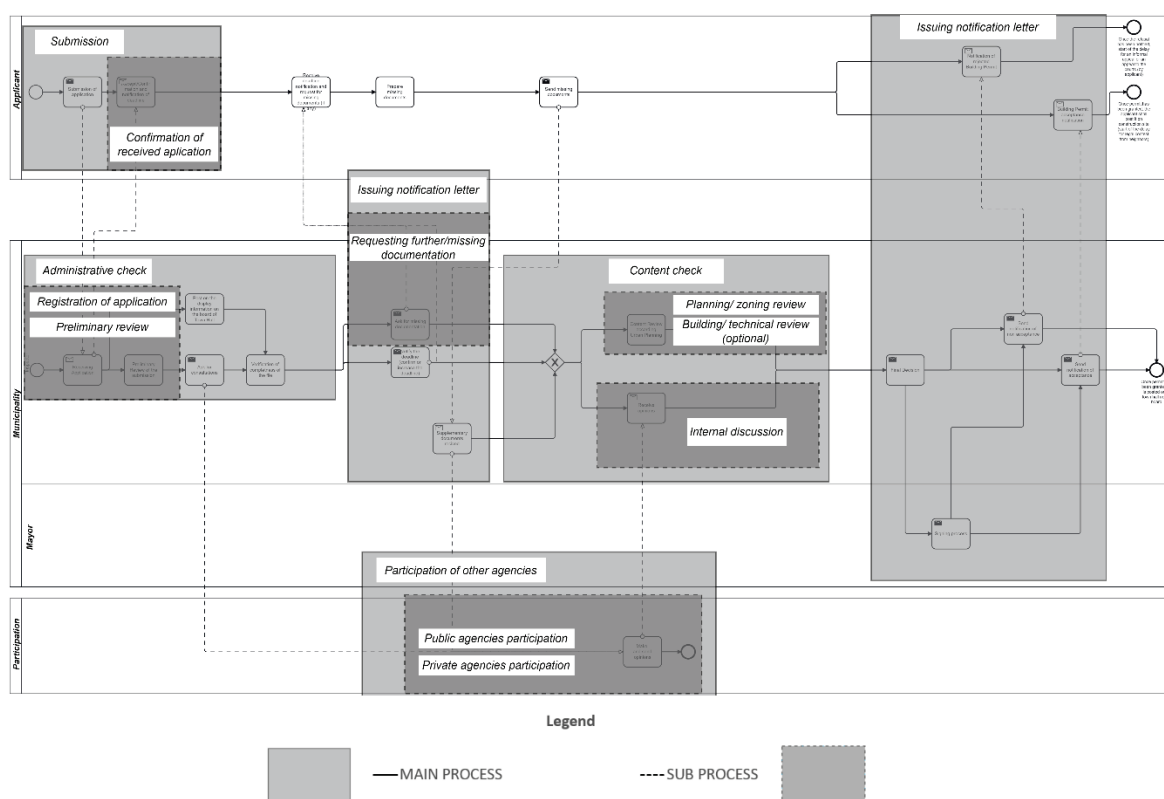


Figure 10: BPMN Diagram of Building Permit Process in France

## 6.8 Germany

In Germany, the building permit review starts with the submission of the building application. Usually, the building application will be registered, and the applicant will be informed with the

registration number. This step is partly digitalized via a submission portal. The usage of such a submission portal is up to the state and the building permit authorities. Within several days after the submission, an administrative review will be performed to check the completeness of the application documents and information. In case of incompleteness, the applicant will be informed and will provide with a limited time to resubmit the missing documents or information. Once the application is complete, it will be forwarded to a content check, as shown in Figure 11. Here, the planning law and the building code will be proofed. Also, municipal law such as development plans will be checked against the submitted project. In larger authorities, the planning check and the building (technical) check is separated from each other and performed by different persons. Often (but not necessarily) in parallel, other agencies are requested to provide a statement for special subjects depending on the intended projects and surroundings' circumstances (e.g., nature protection authority, infrastructure authority or fire safety engineer for special types of buildings). The plan reviewer collects all statements and need to recognize the statement as they may suggest a rejection or conditions to be included in the notification letter of the permit. In case of incompliance with the law, the applicant will usually be consulted concerning the issue. Some authorities have internal meetings to discuss difficult application among the colleagues.

Neighbours or the public will be informed just in special cases. For example, when the neighbouring rights are potentially attacked by the project or when a deviation is accepted. The applicants have the opportunity to present the project information to the neighbours themselves in advance and submit their confirmation together with the building application. After receiving all statements and the content check, the notification letter can be issued, either positive (maybe with conditions), or negative (with reasoning of the rejection). Together with the notification letter, the fee for the review will be issued as well.

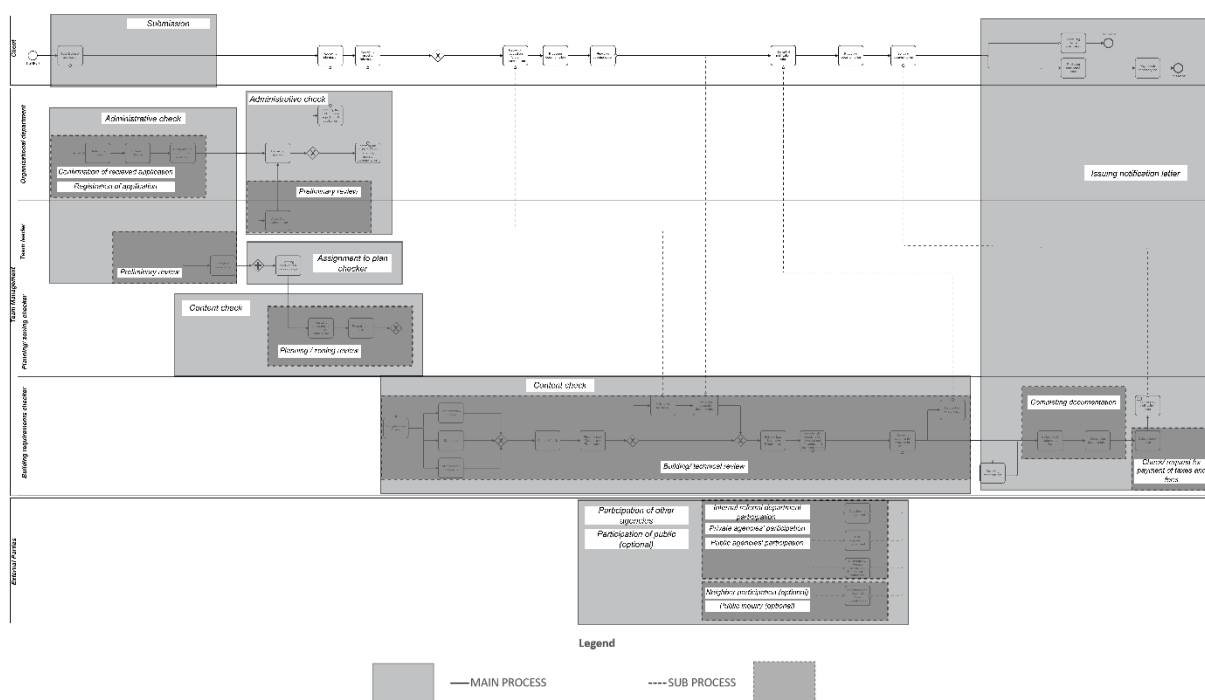


Figure 11: BPMN Diagram of Building Permit Process in Germany

## 6.9 Hungary

Except for construction activities that can be carried out without a permit or after notification (to construct a building of max. 300 m<sup>2</sup> and minor modifications basically), the construction and expansion of buildings in Hungary can only be commenced with a final building permit.

The process of construction permitting is initiated by the client through the Electronic Documentation System (ÉTDR) that supports building authority permitting procedures. Throughout the procedure, the client can be the developer, owner, authorized representative, or even a neighbour, if they engage in the process.

If necessary, prior to submitting the application, local urban planning assessment procedures must be conducted according to the regulations specified in the urban planning ordinance of the respective settlement. This involves obtaining the professional opinion of the local chief architect or planning council. It is possible to obtain preliminary professional authority resolutions, when relevant, but this is not mandatory.

As shown in Figure 12, the application begins with registration, during which the client records their details, the designer's information, and uploads the documents to be attached to the file onto their own storage space.

After submitting the application, the documentation is shared with the designated building authority, and an administrator is assigned to the case. The administrator verifies whether all necessary documents are available among the shared documents to initiate the procedure. In case of incomplete documentation, the client is notified to provide the missing information (e.g., authorization certificate, proof of payment for administrative fees, missing settlement planning opinion, etc.). Following the client's submission of the missing information, the administrator initiates the procedure. The processing time is 35 days in case of involving expert authorities – when necessary - and 25 days without examination of expert issues and 75 days for larger commercial buildings.

The administrator begins the content review of the documentation and forwards it to the relevant expert authorities. During the content review, the expert authorities may request additional information through the administrator. The administrator checks the compliance of the documentation with the relevant regulations and may request further information from the client.

During the procedure, the administrator conducts an on-site inspection, and a document with evidential force is prepared. The authority informs clients of the date of the on-site inspection.

The decision reached at the end of the investigation becomes final with the notification, that is sent to clients, and all involved by postal mail and electronically through the ÉTDR platform.

At the general information interface of ÉTDR, anyone can view the key details of the investment, as well as the detailed site plan and elevation plan or visual rendering.

Within 15 days of the notification, the client may file a lawsuit on ÉTDR itself or via regular mail. The authority generates an individual access code for the court and sends the lawsuit and code to the court.

The court opens the case in the ÉTDR through the public interface using the unique code and begins the examination of the documents. The submission to the court does not take place



through the ÉTDR platform. Within 8 days after submission, the court either approves or annuls the administrative decision or instructs to commence a new procedure.

The building permit is generally valid for 4 years, if the works have been commenced in a lawful manner during this period, there are 6 years from then on to obtain the building occupancy permit.

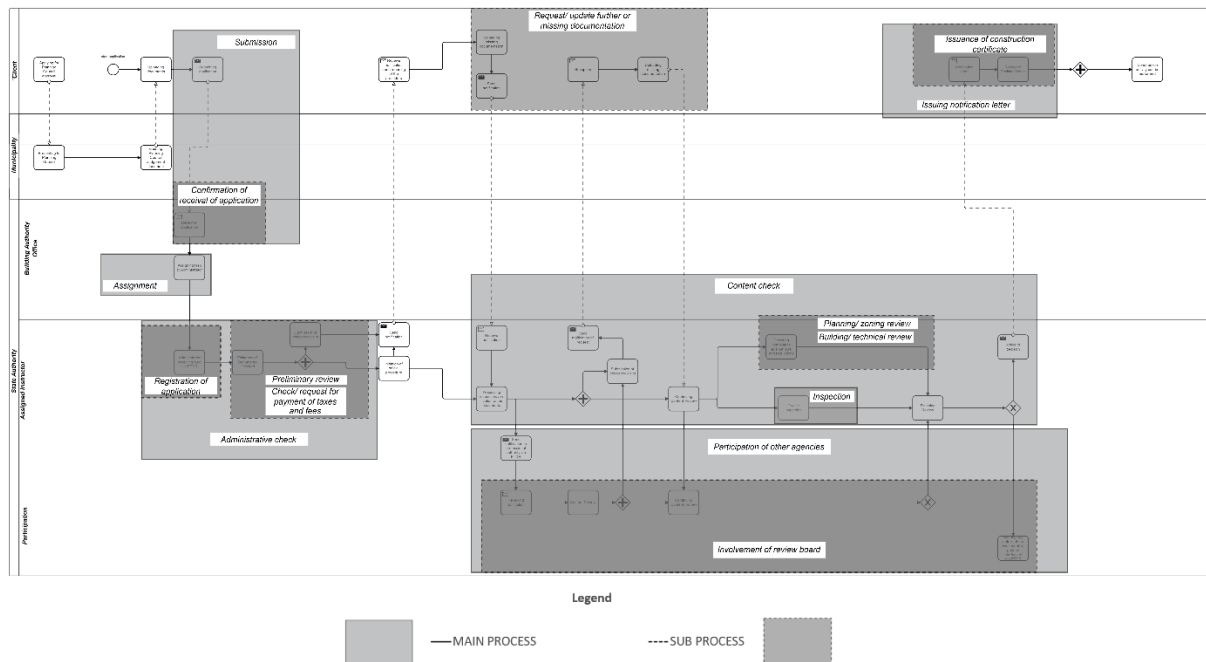


Figure 12: BPMN Diagram of Building Permit Process in Hungary

## 6.10 Italy

Considering the three sizes - Small/Medium/Large - of municipalities interviewed for the process investigation for building permit issuance no relevant procedural differences emerge. The process may in fact change marginally in Italy depending on the size of the city and specific local regulations. For the most part, the map resulting from the comparative analysis contains procedural aspects common to processes mapped in all three municipalities, confirming the similarities arising from the national regulatory framework. The main difference between large cities, medium-sized and small municipalities concern the complexity of local regulations, and the amount of documentation required. In the comparative analysis of building permit processes in different urban dimensions, it also emerges that the substantial differences are mainly in terms of sequential order, with variations relating to the order in which certain steps are carried out, while the fundamental components of the procedure remain essentially unchanged. A description of the combined process for issuing a building permit follows (see Figure 13): The building permit application must be made, by law, by a licensed architect or engineer. Moreover, the application is always submitted digitally on the SUE-portal (Sportello Unico per l'Edilizia) through which the progress of the procedure can be monitored and there is the possibility to interact with the building permit authority to respond to any requests for additions to the procedure.

Once the application is received on the SUE portal, the building permit authority proceeds to assign a protocol number to the file and formally assign an inspector to review it. The assignment is made in proportionality to the work already assigned to the staff and can be assigned automatically by an algorithm through the portal, or it is assigned by the director or sector supervisor.

Although an initial formal review is done by the platform the assigned inspector is responsible for checking that the attached documentation is complete.

Next, the inspector is responsible for reviewing the contents during which he may ask the applicant to upload additional documentation or make minor changes.

In order to issue the building permit, it may be necessary to obtain approvals from authorities, which may be internal or external to the building permit authority. The participation of the authorities may take place once the content review has been completed or in parallel, usually after the inspector has conducted urban inspections. For ordinary building permits, the approval of the authorities is usually obtained individually. Instead, when many authorities are involved, the Conference of Services is called to discuss and resolve specific issues jointly, simplifying the dialogue among the stakeholders involved for the purpose of issuing statements. Generally, the applicant has the option of requesting authorizations from external agencies by himself in order to reduce the procedure before submitting the application.

Once approvals are received, the assigned instructor formulates a final proposal that he discusses with the director and the team since the office director's signature is required for the final decision. In particular, the medium size municipality formally calls an internal assembly to collectively decide on any final proposal.

In the case of a negative decision, the inspector makes a “notice of denial” notification on the portal. Once the notification is received, the applicant has a limited number of days to respond to the communication with additional documentation.

In the case of a positive final decision, the applicant is informed on the platform that he must pay the fees calculated by the inspector. Once the payments are verified as regular, the applicant obtains its building permit, which is valid for 3 years if the work is not started.

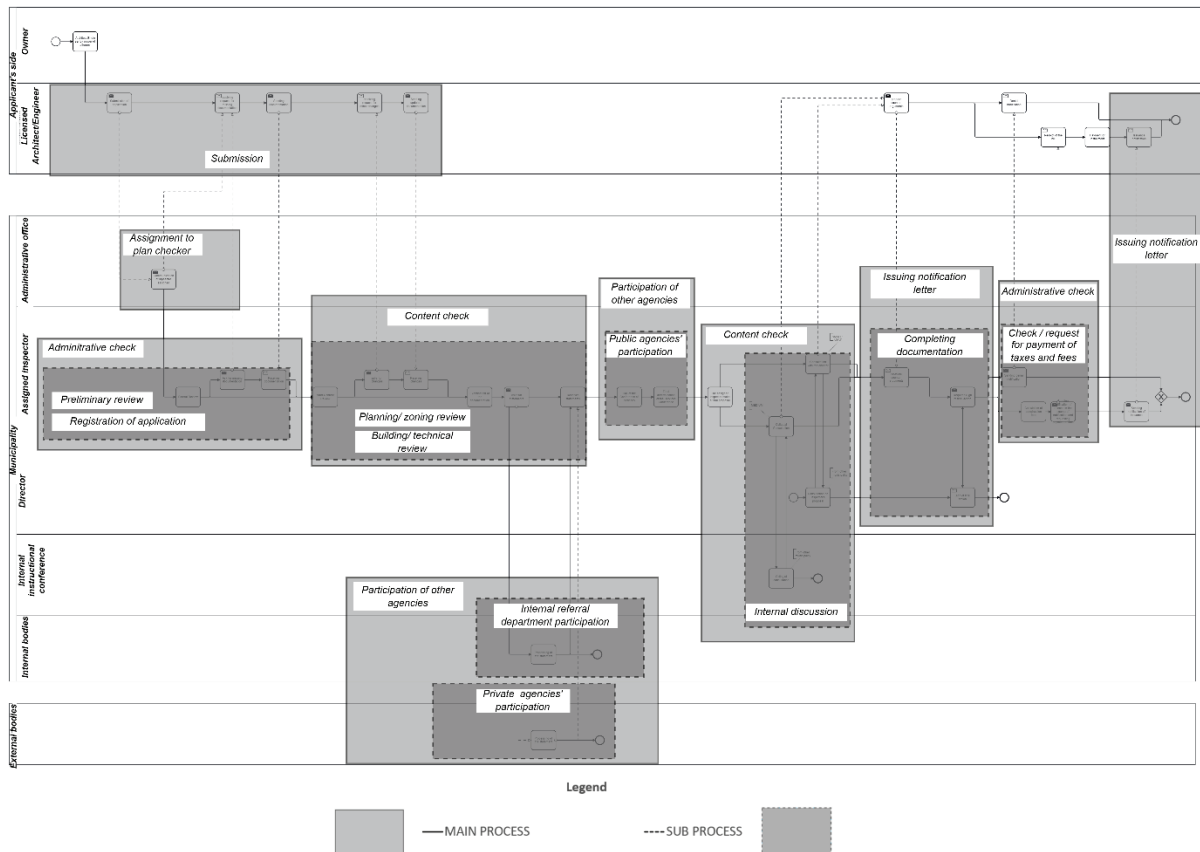


Figure 13: BPMN Diagram of Building Permit Process in Italy

### 6.11 Lithuania

The procedures for issuing building permits are regulated by the Law on Construction of the Republic of Lithuania, detailed requirements are provided in the regulations, approved by the Minister of Environment. The permit for the construction of a new building and other permits related to the construction shall be issued by the director of the municipal administration or an authorized civil servant of the municipal administration.

In order to apply for a building permit physical or legal person shall collect the following documents: personal identification (ID card, other), land ownership documents, the consent of the co-owners, a topographical plan (not older than 1 year), geological survey report (for the design of foundations), vision of the building. As shown in Figure 14, an application with the documentation shall be submitted by e-services in the Territorial Planning and Construction Gate ([www.planuojustatau.lt](http://www.planuojustatau.lt)) at the state information system “Infostatyba” maintained by State Territorial Planning and Construction Inspectorate under Ministry of Environment of the Republic of Lithuania (<https://vtpsi.lrv.lt>). Since the application is accepted in the system (within 3 working days) an applicant or the certified architect shall submit the building’s architectural design and technical documentation and requests for a connection to relevant utility networks.

An authorized civil servant of the municipal administration checks the uploaded documentation in the state information system “Infostatyba” and in 2 days assigns the relevant authorities to be involved for validating the provided documents and managing the

requests. In case an authority does not provide comment or validation within the given timeframe, default consent applies. If the project has been approved by all the entities (including the municipal administration), the designated civil servant of the municipal administration shall announce in the IS "Infostatyba" the granting of the building permit within 3 working days from the expiry of the project's checking period. The applicant can monitor the permit granting processes online as well as communicate with authorities.

In general, following timeframes applied for issuing construction permits if no specific issues occurred: 45 working days for a permit for the construction of a new building or the reconstruction of a special building. 30 working days - permit for the construction of a new or reconstruction of an extraordinary building, written approval of a project for major repairs of an extraordinary building. 15 working days - in cases other than those specified. 10 working days - authorisation to continue suspended construction.

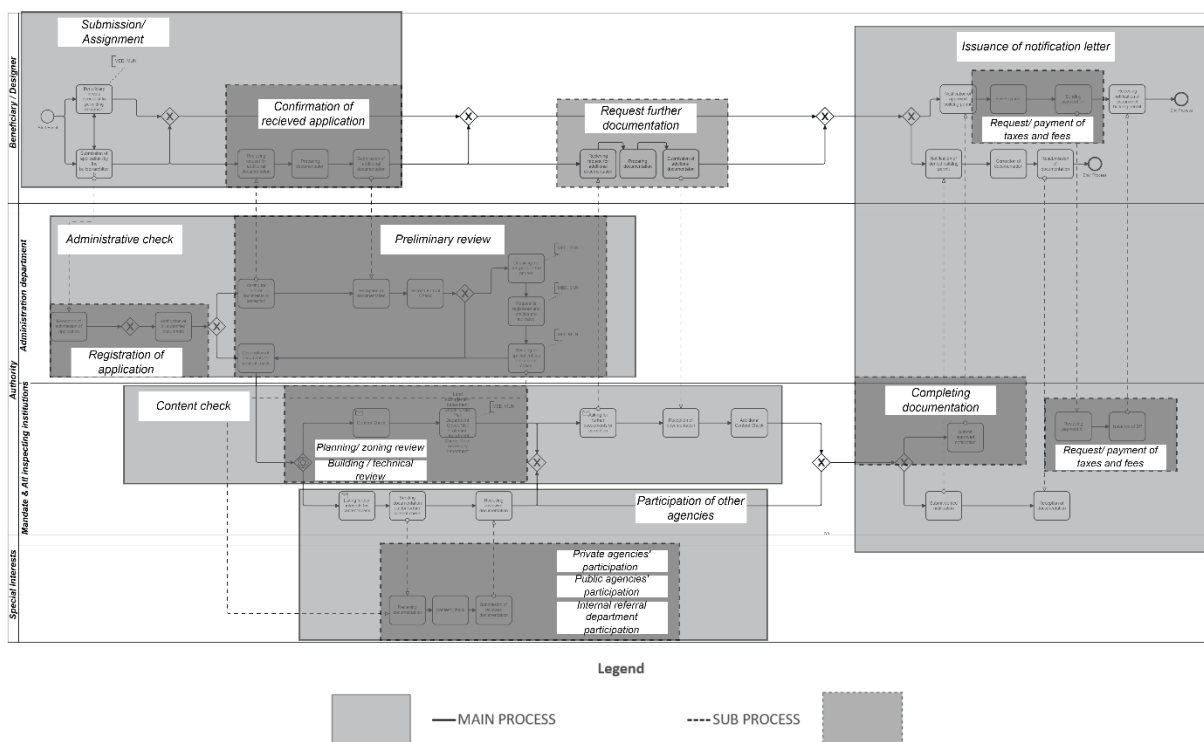


Figure 14: BPMN Diagram of Building Permit Process in Lithuania

### 6.12 Montenegro

Procedures related to obtaining a building permit vary based on the type of building. Formal construction permits are only required for a specific group of buildings known as "complex engineering structures." For other structures classified as "buildings and engineering structures," the process is simpler, involving fewer steps, and does not necessitate a formal building permit. In such cases, the law mandates the submission of a "notification of building work" to the Department for Urban and Construction Supervision, along with specific documentation provided by the investor. Portions of this documentation must undergo formal review and approval by municipal administrative bodies, state authorities, or other stakeholders, including design reviewers.

Before submitting the a "notification of building work", the documentation specified by the Law on Spatial Planning and Construction of Structures must be prepared. The investor initiates the process of documentation preparation by requesting the building permit authority to issue urban-technical requirements (UTR). Subsequently, a licensed designer, employed by the investor, develops a conceptual design. After completing the conceptual design, the investor submits a request for approval to the chief state or city architect (with a 15-day deadline). Once approved, the licensed designer proceeds to work on the detailed main project, as illustrated in Figure 15.

Detailed construction plans (technical documentation) constitute the highest level (main design), and these plans must undergo review by a licensed design reviewer before the application is submitted. During the review process, the reviewer must obtain necessary consents from various public agencies before preparing the reviewer report. The number and types of consents depend on the project type. The law sets a legal deadline of fifteen days for obtaining consent from public authorities.

If this deadline is not met (administrative silence), it is assumed that the authority agrees with the main project, allowing the investor to proceed.

After receiving a positive review of the completed main project, the investor submits a "notification of building work" to the Department for Urban and Construction Supervision in the Directorate for Inspection Supervision. Upon submission, the investor receives confirmation of the application (reference number and date). The case is then forwarded, based on the territorial principle, to the appropriate section of the Department.

The official (inspector) at the Department's section for urban and construction supervision reviews the documentation submitted with the "notification of building work." The inspector has a 15-day deadline to check the documentation and issue a report. If everything complies with the law, the report is positive, and the inspector issues an approval, enabling the applicant to commence construction. If, however, the application does not meet certain criteria, the inspector notifies the applicant (in line with the Law on Administrative Procedure) through instructions, resolutions, or decisions, specifying the required documentation or, in the final instance, prohibiting construction.

Subsequently, the inspector evaluates the documentation supplemented by investor and issues a final decision (positive or negative).

In the case of a negative report, the process concludes, the investor receives a negative decision, and construction cannot commence. The investor has the right to appeal the decision in accordance with the provisions of the Law on Administrative Procedure.

If the inspector fails to submit a report within 15 days of receiving the application, it is considered "silence of the administration," granting the investor/applicant the right to start construction.



Subsequently, the application form is submitted digitally, by the Digital System Environment Act, and enters the building permit authority system. At smaller administrative units, where the application is submitted manually, there is a scanning process of the documentation, which is done by the administrative unit. Afterwards the building permitting process begins in accordance with the law under the ministry of Interior and Kingdom relations (BZK). The building permitting process is handled by the Construction and Housing Supervision department in all the municipalities. Inside it this municipal authority is formed by the Management of the department and the assigned building instructors. They oversee the assignments and the permitting checks. The Management of the department assigns the documentation for permitting to the appropriate building inspector. At smaller administrative units, the formal review is done by the management itself. The formal review starts, and if there are missing documents, the reviewer asks the applicant to submit the additional papers.

As illustrated in Figure 16, when the application passes the formal review, it goes further to the content check phase, which is formed by the planning/zoning review, the building as technical review, and it is further assigned to other external public parties in need. In the participation phase, the public is also represented by the neighbour participation, which needs to agree with the planned construction. In case any documents or consents are missing, the definite reviewer needs to address the building permit authority and then the applicant to further submit the deficiencies. The content check lasts two weeks, but in case the documentation requires changes from the applicant, it can be extended for another two weeks.

Whilst the application is passed by all reviewers and checked, the management prepares the final decision notification. The granting of the building permit will be assigned by the authority of the mayor, but it can be often delegated to the department.

After the complaint period is passed, and the necessary payment for the application is done, the documentation becomes legally approved.



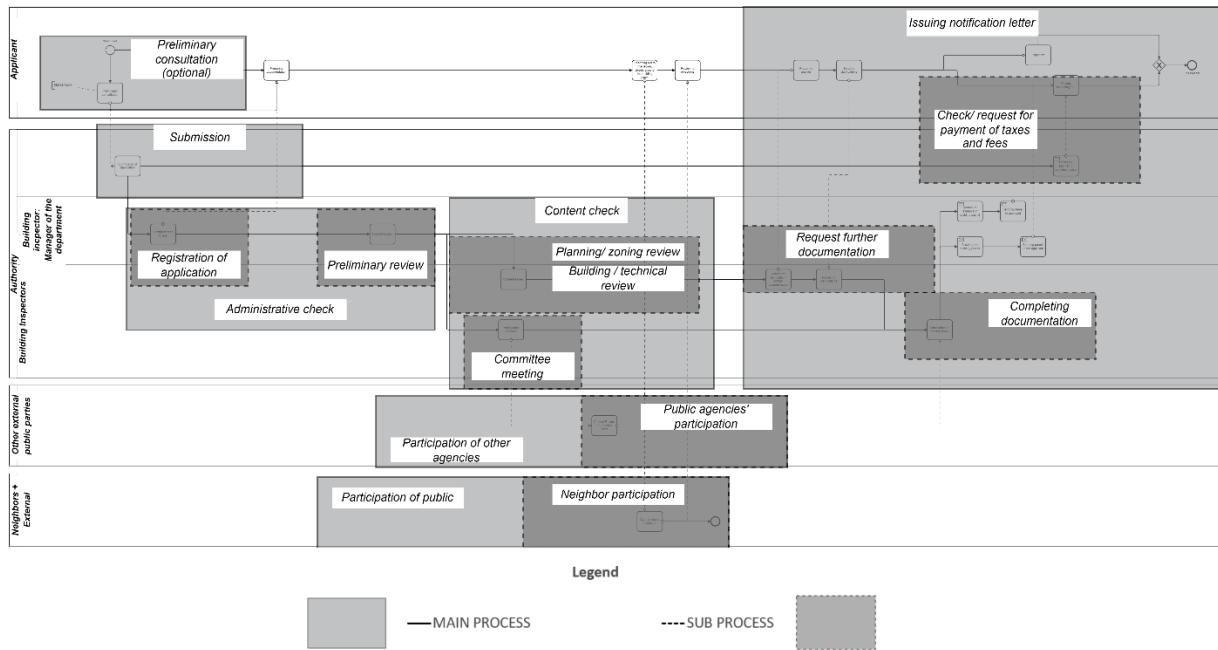


Figure 16: BPMN Diagram of Building Permit Process in the Netherlands

### 6.14 North Macedonia

Building permit process in North Macedonia is regulated by the Law on Construction and related laws and bylaws. The Law on Construction categorize the buildings into A or B category, A-category being buildings and structures with highest importance for the country. This categorization divides the building permit process too. Responsible institution for A-category building permits is the Ministry of Transport and Communications, while for B-category buildings are the municipalities where the building location is. No matter which institution is responsible for the review process, all applications are being submitted electronically through online platform. (administered by the Association of the units of local self-government of the Republic of North Macedonia). Only exemption from this, are building applications in technological industrial development zones in North Macedonia, where responsible institution is the Directorate for Technological Industrial Development Zones.

Building permit application in North Macedonia starts with preparation of project documentation by the design company licenced according to the Law on Construction. The design company is hired by the Investor, who is owner of the land/parcel where the building will be situated, as shown in Figure 17. The Investor provides to the designers various input documents such as Urban Plan documents, geodetic elaborate, land ownership document, programme etc. The designers appointed by the Design company are preparing the project documentation according to the Law on Construction and related bylaws, standards and normatives. The project documentation must be stamped and signed by authorized designers and licenced companies and revised by the authorized reviewers appointed by the hired licenced company for review of project documentation. When review process is successfully done, project documentation can be used for building permit application.

Since 2013, building permits in North Macedonia are handled through online platform [www.gradezna-dozvola.mk](http://www.gradezna-dozvola.mk). Applicant can be any person who is registered on the platform. If

applicant is other person than the Investor, then Investor must legally authorize that person for submitting the documents in his/her name.

Process starts when applicant (who is registered on the online platform) creates a new application for building permit and provides:

- information for the application (type of the application, building category, type of building and address, cadastre plot number, information for the investor, his address etc.)
- information for contact person
- required documents in electronic form (in PDF and/or DWG file format), digitally signed by all responsible persons and entities. The documentation is consisted of urban plan document for the plot, Final design with all required disciplines depending on the project (Architecture, Structure, HVAC, plumbing etc.), Review report, geodetic elaborate, documents that proofs the right to build, document that proofs that administrative tax has been paid, authorization by the Investor for the applicant (if Applicant is another person than the Investor).
- additional documents that applicant considers important for the application review process.

After application is created and submitted, Applicant can electronically follow the status of the application. Additionally, the platform will inform the applicant via SMS and/or email for finishing the each of the phases.

As soon as the application is submitted, the platform sends automatic notification to the building permit authority archive that application has been created. The application then is assigned to building permit officer for review. If the application review process finds some inconsistencies or errors, the application can be returned to the Applicant for additional information and documentation. If Applicant fails to comply to the request for additional information or documentation, or fails to submit the documents on time, the Application will be rejected. Otherwise, if Application is accepted, the Applicant receives notification with the calculation for communal taxes. After taxes are paid and proof is submitted, the Applicant receives a Building Permit that is legally valid after 15 days. Then the construction process can start.

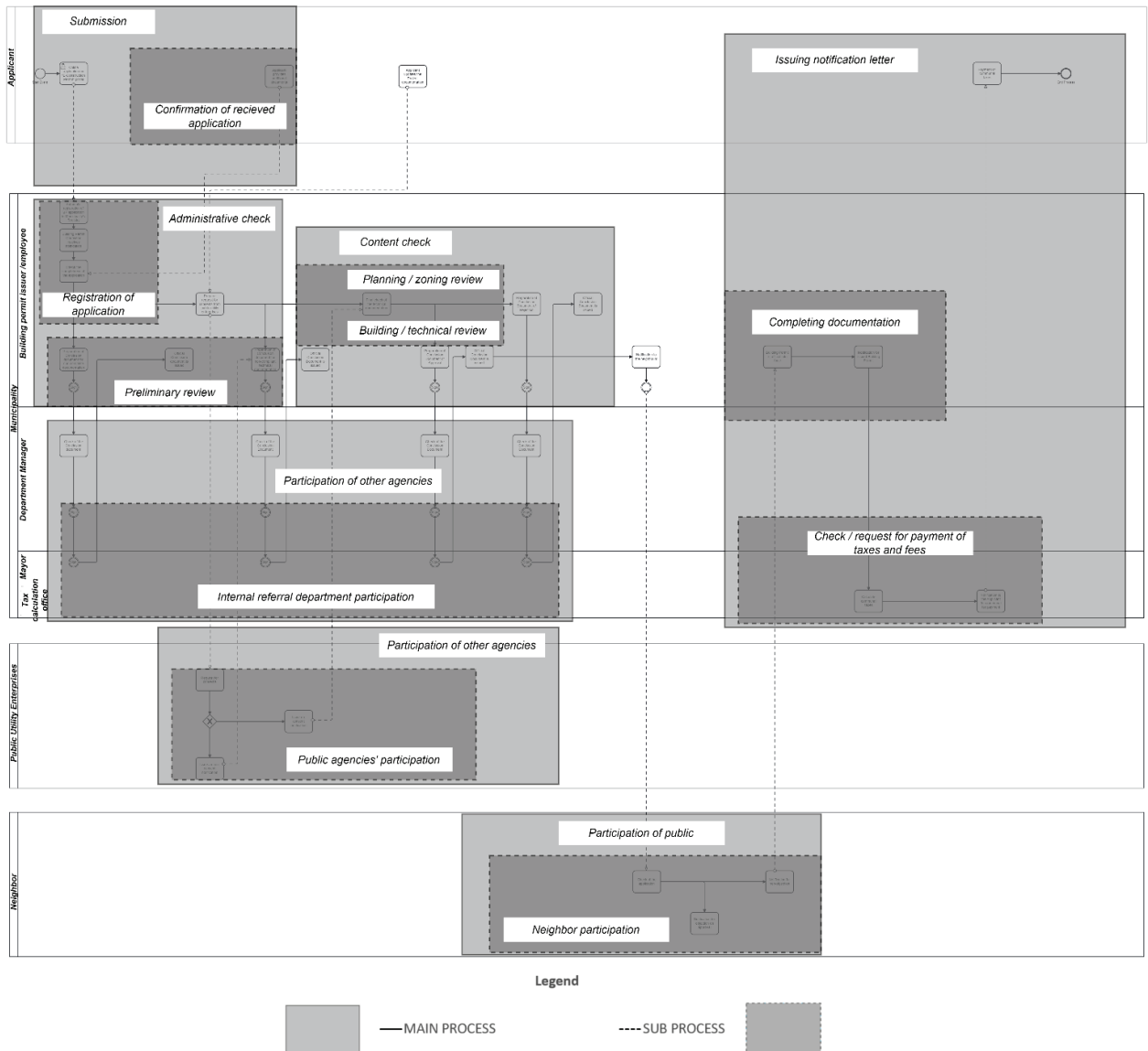


Figure 17: BPMN Diagram of Building Permit Process in North Macedonia

### 6.15 Portugal

Before the submission of the building permit, the applicant can make a pre-consultation with the building permit authority about the fulfilment of all the requirements.

In this pre-consultation, only the architectural design is analysed, and a report is issued to the applicant.

When the building permit is received through an online platform, it goes to the secretariat to create the registry of the project and request the payment of the taxes, as seen in Figure 18. After the payment is confirmed, there is a preliminary check of all the required documentation to check for missing documents (major issues with the documentation). After this step, the process is transferred to the SIG department to verify the georeferencing of the project. From the digital platform available in the building permit authority, all the conditions and constraints that the building needs to comply with are automatically obtained. Then, the

process goes to the formal analysis, where all the documentation is analysed to check for missing information and lack of compliance with formal requirements. During this formal analysis, external entities can be consulted if the project requires. During this phase, if the project requires urban design analysis, the process is passed to the urbanization unit for analysis. After getting all the necessary information, a technician is assigned, and the process of architectural design analysis starts. It is in the step where all the building review occurs, and if needed, the consultation with internal entities can happen. If all conditions are met, the architectural design is approved, and the other disciplines (structural design, MEP design and others) are requested from the applicant.

Then, the applicant submits the other disciplines' designs to the building permit authority, which goes through a formal review process only. If all the documents are validated, the design is approved, and the applicant is notified. Then the applicant is requested to pay the tax for the issuing of the design approval. After the payment confirmation, it starts a period where the process is standing by for the submission of the needed documentation for issuing the construction permit. After the request is made by the applicant, the building permit authority needs to accept and issue a construction permit. Then, the applicant has a fixed period in which to build the building. During this period, there is a construction monitoring process where onsite inspections can happen. Any changes to the original design need to be submitted to the building permit authority for approval.

At the end of construction, the applicant requests the final building permit by submitting the as-built design of the building. After a formal validation and tax payment, if all documentation is valid and approved, the building permit is issued.

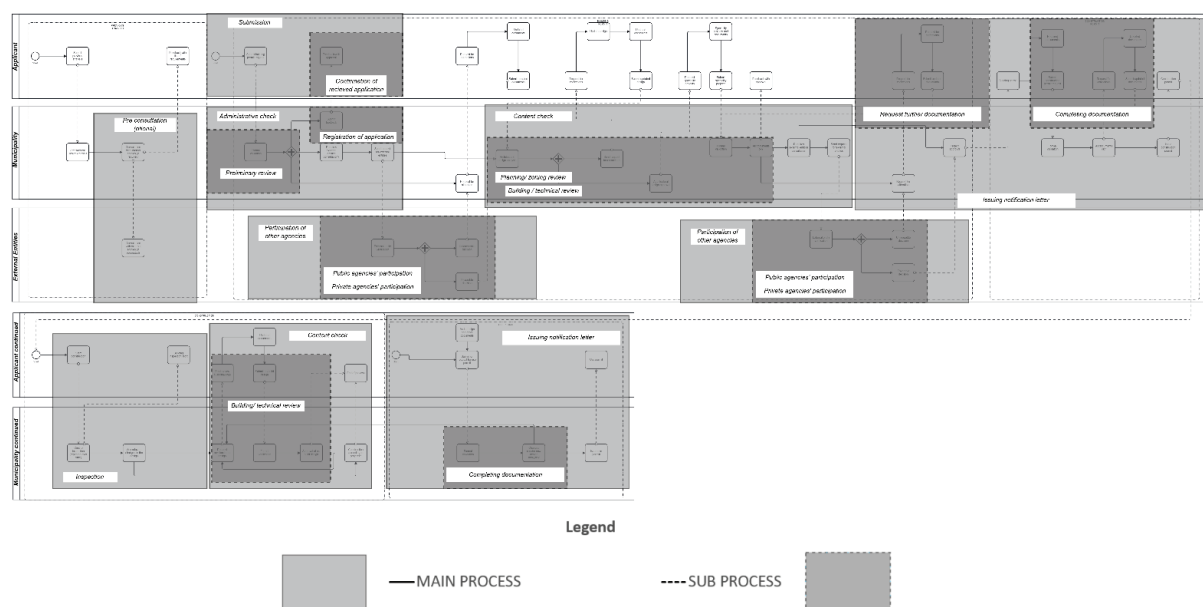


Figure 18: BPMN Diagram of Building Permit Process in Portugal

### 6.16 Romania

In Romania the building permitting process is occurring as follows:

A statement is made for the issuance of the urban planning certificate which is written by the



architect, where certain ideas and plans about the site and future project are described, such as: description of the project, the layout of the future construction, the access to the construction height regime, utilities, together with several other documentation such as the land certificate extract, and the architectural plans.

Following this, the urban planning certificate is issued by the authority, in which it is written the specific regulations that need to be respected for the future building, as well as the specific opinions and expertise which need to be collected. The investor/owner is obliged to acquire the consents from the neighbours, as well as to make the project known in the area around the building.

In parallel to both first parts, the project is being worked on and designed, and remodelled depending on the urban planning certificate or the opinions that are given.

When the project is finalized, the application is submitted by the architect to the building permit department, in larger municipalities digitally, but in the smaller ones physically, where it will go through the formal review process, in the administrative department. As illustrated in Figure 19, if the documentation is not complete, they will ask for further clarification or completion from the architect/investor/owner.

The documentation will be delivered for the content check to the Head of Directorate, where it will be checked, if all the planning/zoning review, building/technical review, neighbour participation, committee meeting and all the required consents that are attached to the documentation are positive. If at this phase any documents or consents are missing, the reviewer notifies the architect or the investor/owner, to rectify the shortcomings. Furthermore, the documentation will be going to the Chief Architect, who will review once again the documentation, and either accept or deny the process. If the Chief Architect of the city approves, the documentation will be moved forward to the mayor, which will give the last decision of the building permit.

After this step, a final decision document will be prepared in accordance with the Procedure Act. In the case of denial, the applicant has a limited number of days to respond to the communication. In the case of acceptance, the applicant will be informed regarding the building permit fee, that will be calculated by the inspector.

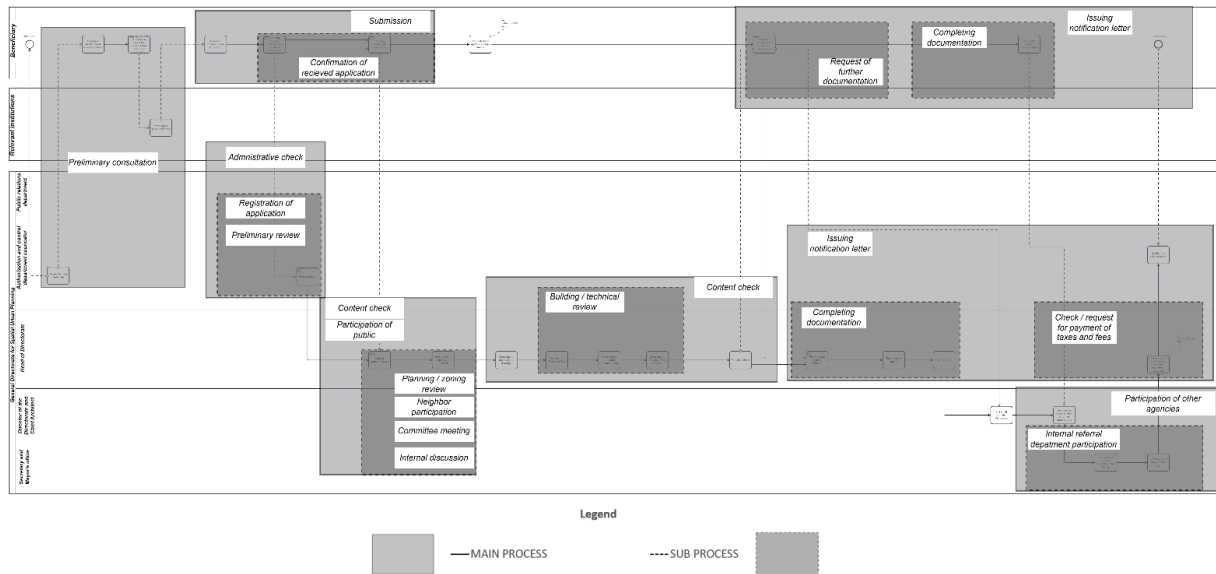


Figure 19: BPMN Diagram of Building Permit Process in Romania

### 6.17 Slovenia

Before submission of the application, the documentation, that is specified by the Building Act is prepared by the designer. The investor/owner can make an inquiry and make a pre-consultation at the building permit authority, to see, if the municipal spatial plan allows for the planned construction.

As illustrated in Figure 20, the investor/owner hires the designer, who prepares all the required documents and acquires all the needed consents from neighbours and external agencies. The investor/owner usually authorizes the designer for the submission of the application. The application form can be submitted digitally, but the documentation has to be delivered in analogue form.

Larger administrative units have a secretary, which makes an administrative check of the application. The application is then sent to the head of the department, who assigns it to the appropriate review expert. The assignment is partially territorial and partially content based. At smaller administrative units, where only a few review experts are employed, the general secretary just sends the application to the head of the review experts, who then assigns it. At smaller administrative units, an administrative check is done after the assignment in a few days after the submission. The application is put into waiting line if it passes the content check.

When the application is first in line for the content check, the expert reviewer checks that all the required consents are attached to the documentation and are positive. The reviewer checks for the existence of additional neighbours or others with legal interest, that have not yet provided the consent.

During the content check, also municipal spatial plan is checked again, even if the positive opinion of the building permit authority is attached. In case of the disagreement with the municipal consent, the review expert consults the building permit authority and tries to resolve it. If some documents or consents are missing, the reviewer notifies the investor/owner and usually also the designer, to address the deficiencies. To reduce the

communication complexity, the whole application is reviewed before notifying the investor/owner in case there are two or more parts of the application need revision.

When the application is reviewed and all the checks passed, the review expert prepares the final decision document, that is prepared in accordance to the General Administrative Procedure Act. After the complaint period is passed, the document becomes legally binding.

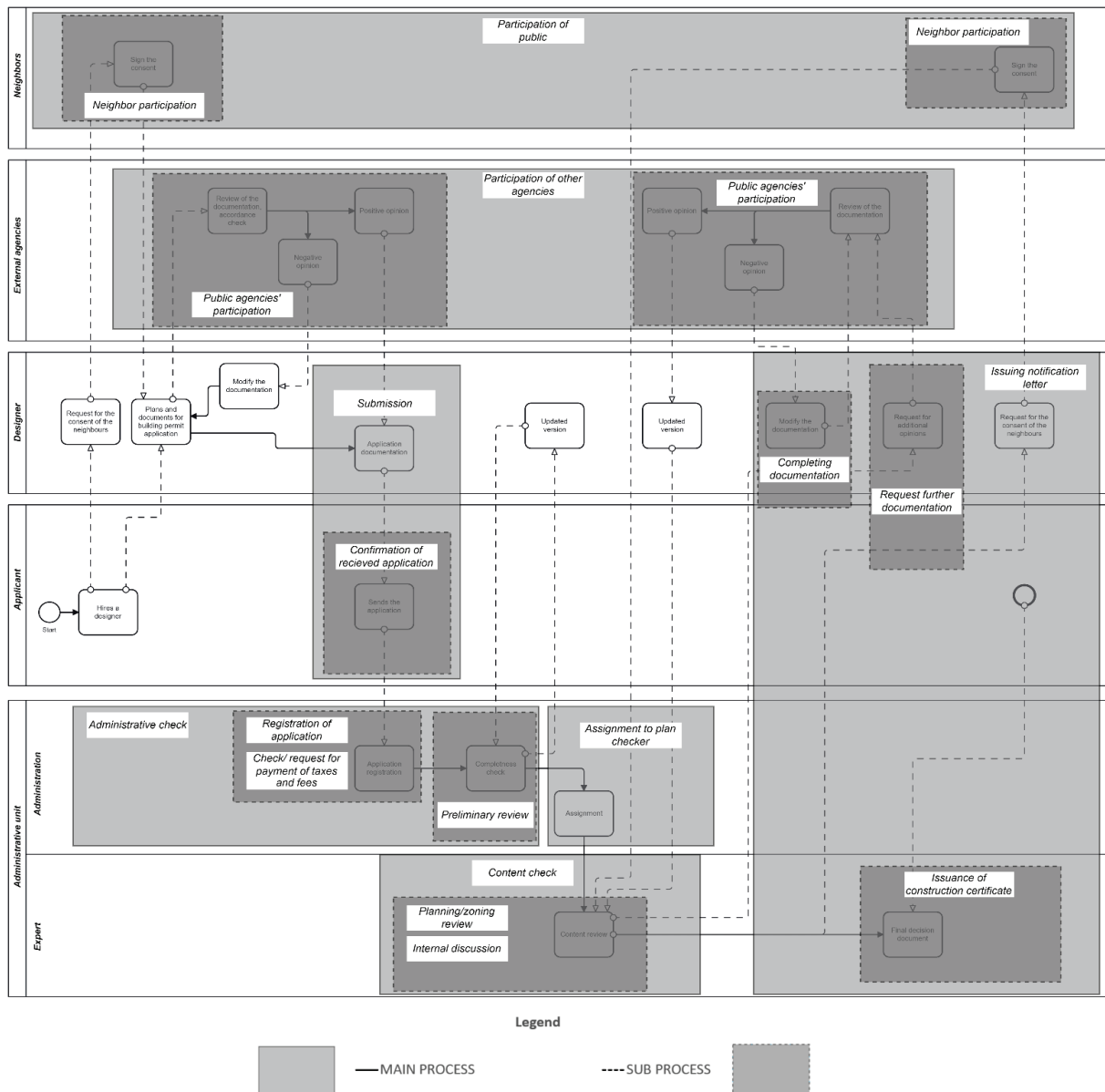


Figure 20: BPMN Diagram of Building Permit Process in Slovenia



## 6.18 Sweden

The applicant prepares the required documentation and submits it to the building permit department at the building permit authority. The applicant can contact the department and have a pre-consultation with a building permit officer to discuss interpretation(s) of the detailed development plan, if there are any wishes for deviation from the development plan etc. and to ensure that all required documentation is included in the application (see Figure 21).

When the building permit is received, an application review meeting is held with a building permit team often consisting of a chairperson/administrator and at least one building permit officer and one building inspector to check if the application is complete. The building permit officer in charge of an application is assigned partly to give officers a variability in types of cases and even workload, and partly by location and expertise. After the review meeting a notification of receipt is sent to the applicant, and if needed a request for additional documentation.

The building permit officer reviews the application against the detailed development plan and sends out documents for referrals, both internally in the building permit authority and to external agencies, as well as neighbour consultation when needed. For difficult questions and interpretations of the detailed development plan, team meetings with several building permit officers are held to ensure that applications are treated equally within the building permit authority. The building permit is granted by the (political) building committee but there is often delegation to building permit officers to grant permits without involving the committee. Depending on the level of delegation, the officer either sends the decision directly to the applicant or prepares documentations for the building committee to make the final decision.

When the building permit is granted and the decision is sent to the applicant the building permit officer is no longer involved in the process, but getting the building permit does not mean that the construction can start. Before the construction can start the applicant needs a starting clearance. The starting clearance is granted by a building inspector at the building permit department. The building inspector has a technical consultation with the applicant and checks the more building technical regulations. How much of the technical regulations that are checked in parallel with the review against the detailed development plan and how much that is checked after the building permit is granted as part of the technical consultation differs between municipalities.

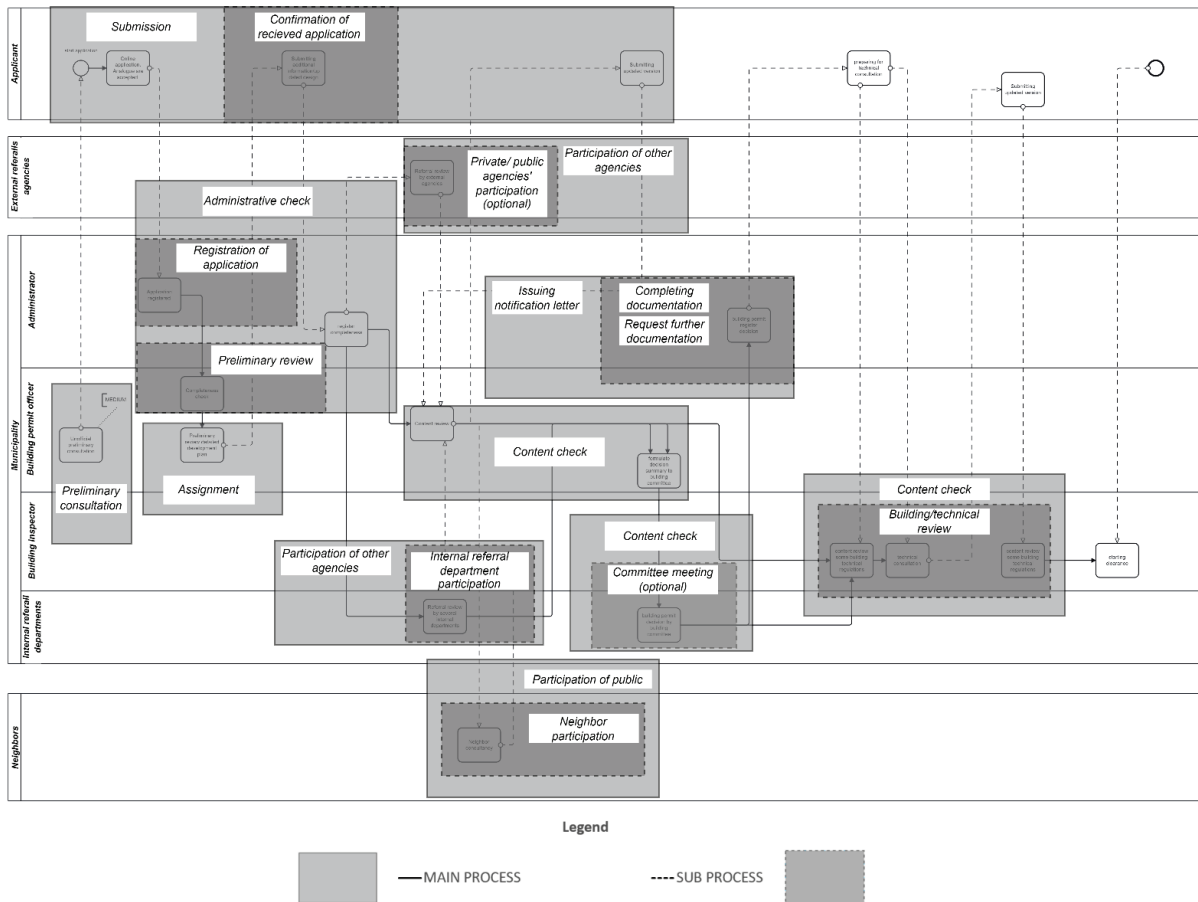


Figure 21: BPMN Diagram of Building Permit Process in Sweden

### 6.19 United Kingdom

The existing process of seeking Planning Approval (zoning) permission is shown in Figure 22. There are two actors shown in the two swim-lanes. The process is initiated by the Applicant (top lane, shown salmon) when the application is ready by '(Re-)Sending the application to the Local Authority'. On receipt the Local authority (lower lane, shown green) will 'Receive the Application and Assess Completeness' (and fees). If incomplete the feedback loop 'Report incompleteness' (shown white) returns to trigger a re-send. If complete, the Local Authority will 'Assess Application' and at the same time conduct 'Public Consultation'. Once both processes are completed, officers will 'Recommend for Approval' or 'Recommend for Rejection'. The officers will either 'Send to the Planning Committee' for political assessment or use their powers over minor applications to 'Decide under Delegated Powers'. The process will result in either the decision to 'Reject Application', or 'Issue Planning Permission' so that the applicant can 'Receive Planning Permission'. the permission remains valid for 5 years.

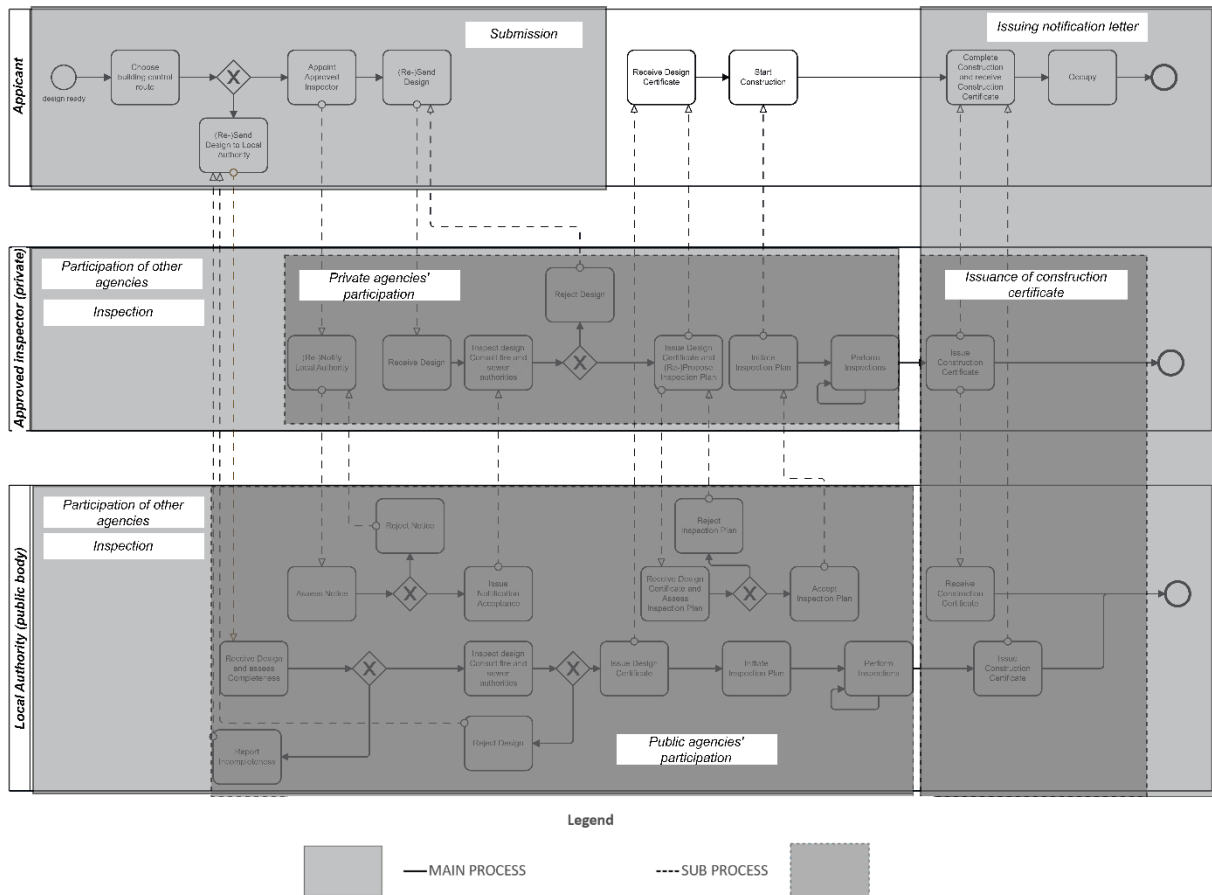


Figure 22: BPMN Diagram of Building Permit Process in United Kingdom

The process of seeking Building Control (technical) approval is shown in Figure 23. Assuming that no private certifier is commissioned, there are two actors shown in the two swim lanes. The process is initiated by the Applicant (top lane, shown salmon) when the design is ready by '(Re-)Sending the design to the Local Authority'. On receipt the Local authority (lower lane, shown green) will 'Receive the Design and Assess Completeness' (and fees). If incomplete the feedback loop 'Report incompleteness' (shown white) returns to trigger a re-send. If complete, the Local Authority will 'Inspect the Design and Consult fire (and sewer) authorities'. If rejected, the second feedback process loop 'Reject Design' also returns to trigger the applicant to re-send the design. If accepted, the Local Authority will 'Issue Design Certificate' to the Applicant which allows the 'Start Construction'. The Local Authority will 'Initiate the Inspection Plan' and 'Perform Inspections' repeatedly until they are satisfied and then 'Issue Construction Certificate' allowing the Applicant to 'Complete Construction and receive the Construction Certificate' prior to moving to 'Occupy'. The Applicant and Local Authority processes terminate separately.

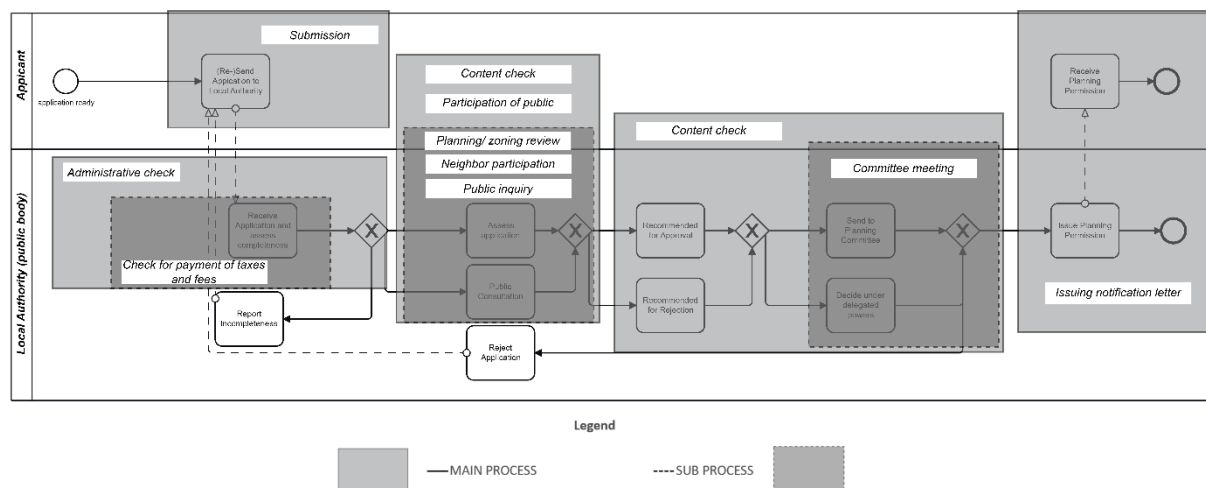


Figure 23: BPMN Planning and Zoning Diagram of Building Permit Process in United Kingdom

## 7. REPRESENTING EUROPEAN BUILDING PERMIT PROCESSES

Our study provides a detailed examination of building permitting processes using qualitative data from interviews and visual BPMN mapping. It highlights the unique regulatory approaches, challenges, and technological adoption in different countries, offering an in-depth view of how building permits are processed. We identified key themes such as the variability in compliance, risk management, and the involvement of different authorities. Additionally, our study underscores the complexities in harmonizing these processes across regions, while also acknowledging limitations in data coverage and potential biases. This granular approach enriches the broader understanding of building control systems.

### 7.1 Reflecting with background (country systems and statistics)

The comprehensive examination of building control systems across Europe, as delineated by the Consortium of European Building Control (CEBC) in their February 2024 report [135] and the focused analysis provided in our study, offers a broad view of the regulatory landscape governing construction practices. The CEBC report serves as a very general understanding of the multifaceted nature of building control systems in Europe. The report's methodology, encompassing a wide-ranging survey from 18 countries, reveals varied regulatory frameworks, control practices, and enforcement mechanisms to upholding public safety and environmental stewardship.

A key insight from the CEBC report is the heterogeneous approach to building control across Europe, marked by varied compliance to zoning plans, permitting processes, and the adoption of risk-based methodologies. This diversity reflects the tailored strategies employed by different countries to navigate their unique regulatory, geographical, and socio-economic contexts. For instance, the report highlights the widespread application of GIS-based maps for zoning information in most countries, facilitating greater transparency and accessibility. However, the extent of this application varies, with some nations offering comprehensive coverage while others are limited to major urban areas.

Another significant aspect covered in the CEBC report is the engagement with technological advancements and the challenges they pose to existing regulatory frameworks. The evolving

landscape of construction technologies demands continuous adaptation and revision of standards to ensure safety and compliance. The report underscores the necessity for a dynamic regulatory approach that can accommodate these rapid technological changes without compromising on safety or sustainability objectives.

In contrast, our study delves into a more focused qualitative analysis, examining specific processes in the unique case studies using interviews and BPMN diagrams. While the CEBC report provides a macro-level overview looking at very comparable entities of each county type of control if they include, e.g, mechanical, fire safety. Our study is much more interpretive, where these individual entities are not detailed but more on how each country processes building permits. Each of these studies are complementary in the sense that even though they both study the same topic, the result is very different.

Our results likely offer a micro-level examination, highlighting specific, processes, methodologies, or a particular aspect of building control. This focused exploration enriches the broader discourse established by the CEBC report, offering insights into the practicalities, nuances, and outcomes of specific regulatory or technological interventions. The CEBC report details the wide array of controls performed during the planning and permitting phase, with emphasis on zoning plans, GIS-based maps accessibility, permits requirement, fees, and the entities responsible for conducting controls across different aspects. This report delves into the specifics of how these controls are implemented, highlighting differences in practice among countries, the involvement of various authorities, and the extent of their application. Moreover, the report outlines the controls performed during the construction phase, emphasizing the roles of certified private professionals, municipalities, and state institutions across different criteria such as compliance with technical project requirements and construction products. The manuscript provides further insights into these controls, focusing on the technicalities of the review processes, the adoption of a risk-based approach, and the specifics of the controls applied to different aspects of the construction process. Also, report discusses the requirements for commissioning/completion certificates and the extent of controls performed during these phases, including inspections by municipalities and private professionals. The manuscript offers a deeper analysis of these phases, exploring the nuances of the inspection processes, the criteria controlled, and the differences in how these phases are managed across various jurisdictions.

The CEBC report briefly mentions the insurance framework and liability schemes in different countries. The manuscript, however, provides a more detailed examination of the insurance requirements, the entities by which insurance is mandated, and the variations in liability schemes, highlighting the complexities and variations in insurance and liability across different countries. The legal requirements and enforcement, both documents discuss the legal enforcement actions that can be taken for non-compliance during different phases of the construction process. The manuscript, however, delves deeper into the types of penalties, the relevant enforcement bodies, and the specific conditions under which legal action can be taken, offering a more detailed view of the legal framework governing building control systems.

The primary distinction between the CEBC report and our study lies in their scope and focus. While the former adopts a holistic view, encompassing a broad spectrum of practices and challenges across Europe, the latter likely zooms in on a specific issue, technology, or policy within the building control system. This difference in perspective is crucial for a

comprehensive understanding of the field, as it combines overarching trends and policies with detailed analyses of specific interventions or challenges.

## **7.2 Methodological discussion**

Our study's approach to data collection was characterized by a broad spectrum of insights obtained from interviews across municipalities of varying sizes. This diverse sample provided a comprehensive view of the building permitting process. However, certain exceptions due to country size and municipality availability warrant consideration. These deviations might have introduced selection biases, potentially impacting the generalizability of our findings. Furthermore, the semi-structured format of the interviews, grounded in [41] research, ensured a consistent yet flexible exploration of the subject matter.

The transcription and translation processes were undertaken to preserve the integrity of the data. The subsequent 'clean-up' and pseudonymization phases were crucial for maintaining ethical standards. However, the translation process might have nuanced impacts on the data, especially concerning cultural contexts and linguistic subtleties. The potential for loss of meaning during translation underscores the need for careful interpretation of the transcribed data. Ethical considerations were at the forefront of our methodology, with strict adherence to informed consent protocols and confidentiality measures. This ethical rigor was essential in upholding the integrity of our research process. In summary, while our methodology demonstrated a comprehensive and systematic approach to exploring building permitting processes, a critical reflection on the potential limitations and biases associated with our methods is necessary. This reflection not only underscores the rigor of our research but also provides a transparent account of our study's scope and applicability.

Decentralizing the data decoding process to individual interviewers, supplemented by a secondary review for quality assurance, added layers of objectivity and reliability. The unified coding system facilitated a systematic approach to identifying themes and patterns. Our approach involved a detailed mapping of the permitting processes through both textual and visual analysis, allowing for a thorough understanding of the challenges and perspectives. The generalization of these processes within each country was performed to identify overarching patterns. However, the method of generalization and the inherent risks of over-simplification should be acknowledged and critically evaluated.

The use of BPMN 2.0 in our study provided a nuanced and detailed framework for modeling the building permit processes. Its capabilities in handling complex processes and interactions were particularly beneficial. However, a more in-depth discussion on how BPMN 2.0's specific features directly influenced the understanding and representation of the building permit processes across different countries would provide further clarity and depth to our methodological approach. However, the complexity of BPMN 2.0 to express the often very different contexts of building permits can be problematic. The learning curve of BPMN 2.0 is relatively high [135], and the various interpretations of the context and how BPMN 2.0 is used can give unnecessary differences in how the process from each context is expressed. One potential solution for this, could in future work, be identifying better methods for expressing processes such as simpler diagramming formats, like IDEF0, SIPOC or similar.

### 7.3 Limitations

While our study has provided valuable insights into the intricacies of building permit processes through a qualitative approach, it is important to acknowledge certain limitations. The qualitative methodology, while offering in-depth understanding, is inherently bound by the perspectives of the interviewees, potentially limiting the comprehensiveness of our findings. Additionally, it is crucial to note that our study did not encompass all European countries, and therefore, the generalizability of our conclusions may be influenced by this geographical constraint. Despite efforts to ensure diversity in our data set, covering a broad spectrum of perspectives, it is acknowledged that complete coverage was not achieved. Furthermore, the logistical challenge of obtaining three interviews from every country in our study was not fully surmounted, introducing a potential source of variability in the depth and richness of insights from each region. These limitations should be considered when interpreting the results and extrapolating conclusions beyond the specific context of the study.

Failure pathways and appeals are not thoroughly addressed in the current analysis, as secondary pathways fall outside the primary scope of this study. Also, the study is limited by factors such as the frequency and timing of site inspections, the associated fees, and the timeline for project completion. These variables may influence the outcomes and could present challenges in accurately assessing the overall efficiency and effectiveness of the procedures analysed. However, one might question whether the procedural system itself could be examined independently of institutional and cultural factors. It is evident that legal frameworks significantly influence behaviours within the system. For instance, the variability in jurisprudence and the fact that the mayor, as the institutional representative, does not always directly issue the permit, highlight the complex interplay between legal structures and decision-making processes.

### 7.4 Future directions

In the future, our research and the collected data opens opportunities for redefining processes, identifying maturity levels, and exploring the digitalization and automation potential within the studied domain. The established basis for these considerations forms a foundation for proper interpretation of quantitative data, allowing for nuanced insights. An intriguing aspect of our future work involves evaluating the regulatory nature of these processes and investigating the feasibility of developing metrics or scales for measurement. To deepen the understanding of building permit systems, future research could aim to construct a more precise taxonomy of the procedural subsystem by extracting relevant terms from BPMN maps, aligning with the proposed high-level taxonomy. This approach leverages the wealth of information gathered during the interviews, enriching and refining the taxonomy to enhance its accuracy and relevance. It is noteworthy that, in the medium term, the increasing adoption of digitalized procedures may enable the application of Process Data Mining. This could provide valuable insights into the reliability of narratives presented by the various stakeholders involved in the process.



## 8. CONCLUSIONS AND FUTURE WORKS

The issuance of building permits plays a key role in shaping the urban landscape in accordance with sustainability principles and existing laws. Despite being a highly complex process in Europe, it remains largely unexplored in many aspects. Therefore, this report aims to fill this gap, involving 19 European nations in a comprehensive comparative analysis of their processes. The study is intended to provide the scientific community and practitioners in the building permit domain with a solid foundation for understanding, implementing, and serving as a reference for future research.

To conduct a clear comparative analysis of international processes, a robust methodology was adopted to systematically and uniformly collect data in the initial phase through a detailed guideline for expert interviews in the process. This step ensured the consistency and quality of the collected data, enabling qualitative analysis and the subsequent generation of generalized maps in BPMN 2.0 standards. These steps allowed the construction of a comprehensive and comparable framework of building permit processes in 19 European countries, including municipalities of varying sizes. The creation and validation of a detailed BPMN categorization with taxonomy were essential, enabling the synthesis of complex processes into a structured format.

The study consists of descriptions of the respective building permit system and the process accompanied by a BPMN map. The results were reflected by the statistical data from the respective national data bases.

The results highlight the complexity hidden beneath the apparent uniformity of processes. Indeed, the in-depth analysis of processes has brought to light specific characteristics of each nation, emphasizing the importance of understanding the nuances at the local level. These nuances extend beyond procedural aspects and are rooted in cultural, historical, and economic contexts. While the EU advocates for the harmonization of procedures, this report sheds light on the challenges associated with the diversity of local processes. This implies the need to strike a balance in favour of flexible solutions that adapt to local conditions while maintaining a consistent and standardized approach at the European level.

The applied method also underscores the importance of adopting a holistic view that incorporates both policy frameworks and operational realities in detail. To ensure the validity and reliability of the obtained results, a rigorous process was employed. The use of a single guide for interviews and a common coding scheme ensured the collection of reliable and comprehensive data. Additionally, individuals involved in data collection interviews possessed a deep understanding of the process in their respective nations, further elevating the quality of the data. Peer debriefing, member checking, and collaborative discussions within the research team were employed to enhance interpretation validity, introducing a layer of triangulation to strengthen the analysis.

One of the main implications of this study is the gathered and structured knowledge of building permit processes in a unified way. That will enable future research to approach quantitative data (e.g., information needed) and get the correct interpretation based on country-specific circumstances.

The report aims to contribute to the field by modelling building permit processes in a detailed and unified manner, providing a comprehensive understanding at various levels.



This will enable future research to address quantitative data (e.g., required information) and achieve accurate interpretation based on country-specific circumstances. The results obtained and the adopted approach can contribute to the formulation of more effective policies and inspire providers to develop better solutions and practices.

The collected data set provides much more opportunities for further analyses while the report represents the basis for future studies in the building permit domain. The future directions of research align with the legislative intentions of the EU, pushing towards the development of frameworks that enable the issuance of digital building permits and the creation of a more harmonized regulatory environment. The integration of GIS and BIM represents a significant opportunity to implement efficiency and accuracy. However, it is crucial to further delve into procedural and cultural aspects, not solely focusing on technological transitions. The approach followed in this research may, in the future, contribute to providing an even more detailed framework by constructing a more detailed taxonomy of the procedural subsystem, enriching the accuracy of the identified processes. Such future developments can contribute to providing a solid foundation for further research in the development of practical solutions that can more effectively and adaptively meet the needs of municipalities across Europe.

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