

**Evaluation of the Design Approval and Project Follow-up Processes of Adama City's  
Construction Authority, Ethiopia**



**Eyob Yohannes**

**A Thesis Submitted to  
The Department of Civil Engineering  
School of Civil Engineering and Architecture  
Presented in Partial Fulfillment of the Requirement for the Degree of Master's in Civil  
Engineering (Specialization in Construction Engineering and Management)**

**Office of Graduate Studies  
Adama Science and Technology University**

**August, 2024  
Adama, Ethiopia**

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**Advisor: Bahiru Bewket (Associate Prof.)**

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## DECLARATION

I hereby declare that this master thesis entitled “Evaluation of the Design Approval and Project Follow-up Processes of Adama City’s Construction Authority, Ethiopia” is my original work. That is, it has not been submitted for the award of any academic degree, diploma or certificate in any other university. All sources of materials that are used for this thesis have been duly acknowledged through citation.

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I, the major advisor of this thesis, hereby certify that I have read the revised version of the thesis entitled “Evaluation of the Design Approval and Project Follow-up Processes of Adama City’s Construction Authority, Ethiopia” prepared under my guidance by Eyob Yohannes submitted in partial fulfilment of the requirements for the degree of Master of Science in Civil Engineering (Specialization in Construction Engineering and Management). Therefore, I recommend the submission of the revised version of the thesis to the department following the applicable procedures.

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## APPROVAL PAGE

I, the advisor of the thesis “Evaluation of the Design Approval and Project Follow-up Processes of Adama City’s Construction Authority, Ethiopia” and developed by Eyob Yohannis, hereby certify that the recommendations and suggestions made by the board of examiners are appropriately incorporated into the final version of the thesis.

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## **ACKNOWLEDGMENT**

First and for most, I would like to thank the Almighty God, who has given me the patience and endurance to finish this work. I would also like to forward my gratitude to Dr. Bahiru Bewket, who, as the main advisor of the research, supported me in guiding on the overall study, and in commenting and reviewing the document to meet the required standard. I would also like to appreciate all the teaching staff of the civil engineering department of ASTU for their good delivery of the course works, which have enhanced my understanding on the specialization. Sincere acknowledgment also goes to the design approval and project follow up staff members at the sub-cities of Aba Geda (Smart City) and Lugo of Adama City. Their assistance made the collection data required for the study easy for me; they participated in filling out the questionnaires and provided valuable information for this study. I am also grateful to my friends for the support they showed to me throughout this study. Finally, I must express my sincere thanks to all those people who made this thesis possible and an enjoyable experience for me.

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## LIST OF ACRONYMS

A/E	Architect/Engineer
BPCO	Building Permit and Control Office
BPCA	Building Permit and Control Authority
BCO	Bid-ability Construct-ability Operability
CIDCA	Construction Industry Development and Control Authority
CO	Central Office
ETB	Ethiopian Birr
EIA	Environmental Impact Assessment
EEA	Ethiopian Economic Association
GIS	Geographic Information System
GPS	Global Positioning System
HPR	House of Peoples Representative
LDMB	Land Development and Management Bureau
MMDA	Metropolitan Municipal and District Assemblies
MoUDC	Ministry of Urban Development and Construction
NCA	National Construction Authority
PPE	Personal Protective Equipment
RII	Relative Importance Index
SC	Sub City
SCs	Sub Cities

## ABSTRACT

*Building projects which are managed by private investors contribute a lot for improving a city's appearance, modernizing and making the different service provisions convenient. However, these benefits of a building project will be achieved only if the projects are developed with respect to the public interest and public safety during their construction. In this regard, the execution capacity of the mandated government authorities for ensuring the compliance of the design as well as construction of a building with predetermined standards and provisions within the building legislation are decisive. Thus, this study tries to review the design approval and project follow up provisions within the building legislation, to examine current practice of design approval and project follow up processes and to identify the challenges encountered by the respective officials while accomplishing design review and project follow up tasks in Adama City. For attaining these objectives data were collected through integrated methods of document review and questionnaire survey. The findings of the study showed that the building legislation did not have adequate provisions for the permit and follow up of temporary structures and methods of work. The survey findings have also found out that the building inspection is short of the staff running the task. Challenges emanating from designing entities and investors occupy the first ranks in creating obstacles for the design review activities; whereas, lack of transportation facility, preceding the work before design changes are approved and inadequate number of staffs occupies the first three ranks in the project follow up challenge list.*

**Keywords:** *Building Project, Design Approval, Directive, Follow-up, Proclamation, Regulation*

## CHAPTER 1: INTRODUCTION

### 1.1 Background of the Study

The construction industry is a key sector of the economy of every country noted that, the industry is important because of the outputs and outcomes of its activities, whilst contributing to national socio-economic development by providing the buildings which are used in the production of all goods in the economy. Moreover, the physical infrastructure, built through construction activity, is the nation's economic backbone as it forms the arteries for the facilitation of productive activity by enabling goods and services to be distributed within and outside the country (Offei et al., 2019).

Similar to most developing countries, Ethiopian cities are characterized by various critical problems. Among them, unemployment, poverty, poorly developed infrastructure, inadequate shelter provision and poor social and economic facilities tend to be significant. It is obvious that all these problems are mainly resulted from the mismatch of demand and supply, and lack of good planning and governance. The supply of infrastructure and service is lagging behind the fast population growth rate and urbanization.

Urban services are the first and the most important services that are needed to foster a city's growth. Moreover, they are critical for the flourishing of economic growth and quality life. Infrastructure and building construction plays a crucial role in promoting economic growth and thereby contributes to the reduction of economic disparity, poverty and deprivations in a country. However, most of urban services provided in cities like Adama are scanty or cannot respond to the parallel high growth rate of population and urbanization. Similar to other developing cities, the Adama city's urban service is often subject to haphazard planning, disjointed implementation and poor post installation management (Bulti, 2017). Since infrastructure development took the lion share of the cities and countries resources and indispensable services for the day-to-day life of the community, development need to be managed and planned in a proper manner, and for this standards and regulations should be considered (MUDH, 2007).

Construction projects involve many stakeholders who play different roles at different stages, during and after the project execution. Construction project stakeholders are commonly divided

into two categories according to their relationship with the client: direct (internal) stakeholders, who are in legal contract with the client and indirect (external) stakeholders, who also have direct interest in the project though not necessarily having direct contracts with the client (Watts, 2014). The external stakeholders are further sub-divided into private and public actors. Regulatory agencies and local, regional, national and international government agencies are categorized under public external stakeholders.

Regulatory bodies or statutory bodies are government bodies that look after the project complies with the general public's interest, prepare a general development scheme, look after the safety, legal and commercial issues associated with the project, and look into the environmental, cultural and social effect that the project induces. The primary role of the municipal building departments is to manage the process, confirm compliance with applicable laws, verify that building plans comply with the building code, undertake site inspections as necessary and issue occupancy permits (IRAC, 2014). The mandated authorities who are responsible for undertaking the above-listed tasks may vary from a nation to another in terms of their naming as well as their scope of roles and responsibilities. According to article 4(1) of the Ethiopian Building Proclamation No. 624/2009, any person intending to carry out construction shall apply to the urban administration or designated organ.

Adama is one of the cities in the rift valley area of Oromia region and, the city's population has radically increased. Thus, the city faces big challenges arising from lack of implementing the infrastructure development in an integrated way with Adama City construction authority and Adama City municipality office. Sahle and Aregawi (2021) revealed that splashing billions of birr and crafting development oriented policies, but lack of integration among different utility providers result in project delays and capital inflation, besides creating chaos on the day to day activities. 'Utility services provider and the other organizations behind construction usually get each other's throats criticizing for damage caused dismantling each other's' facilities while working on their respective projects' (Seife, 2019).

Despite the significant role of the regulatory agency in reducing economic and engineering damage caused by lack of integration and follow-up activity as well as preparing ahead plan to new map and strategy to avoid further damages, there is still frequent damages on building

infrastructure (Hailmareyam, 2011). Research works show the practiced building and infrastructure construction integration management system to be very poor; municipalities are facing unprecedented challenges in the management of construction assets due to the increasing number of aging construction assets, the ever-increasing demand and sustainability requirements, increasing maintenance deficit, and declining or static maintenance budgets in relation to City infrastructure development projects (Zegeye, 2012; Esubalew, 2017; Yilema & Gianoli, 2018). Specifically, Yilema & Gianoli (2018) showed the major economic, social and environmental effects of poor sectoral coordination on local residents, service providers and the nation at large.

The economic effects on service providers are characterized by property damages, high cost of compensation, cost of carrying out repairs and re-locations, cost for any temporary service arrangements necessary, and the possible loss of "product" and revenue reduction during construction. The effects on utility customers include frequent service interruptions, quitting business and data loss, and for industrial properties, halting production and damage to machinery, low productivity, decrease in number of customers, low profit etc. The social effects of the problem include safety hazards. As per the environmental effects of the problem, contamination of water supply, sewage backing up, flooding and storm water inundation, noise pollution, air pollution, and dust induced lung diseases are common.

In the case of Adama, the Building Permit and Control Office (BPCO), which is organized in each sub-cities, is designated by the urban administration to accomplish such responsibilities. For buildings that are above two stories, it is the city's BPCA, conventionally called the Central Office, which is designated for undertaking building permits and construction follow-up. The Adama City Construction Authority plays a pivotal role in ensuring the successful implementation of construction projects within its jurisdiction. This study outlined a comprehensive evaluation of the design approval and project follow-up processes employed by the authority. It has the primary objective to identify strengths, weaknesses, and areas for improvement, ultimately enhancing efficiency, transparency, and the overall success of construction projects.

## **1.2 Statement of the Problem**

Construction is complicated because it comprises large numbers of parties as clients, contractors, consultants and regulators. Despite the complexity, the industry plays a major role in the development and achievement of society's welfare. However, it can be considered as a dynamic industry which is constantly facing uncertainties. Besides uncertainties, the involvement of many stakeholders makes the management of cost and time difficult which consequently causes time and cost deviation. Countless projects and teams fail their innovation process due to performance issues caused by missing steps, activities and timelines, inadequate quality of execution and unreliable data, which can all be traced to poor organizational design and leadership (Hoegl & Gemuenden, 2001).

The number and size of construction projects that are being constructed in Ethiopia are increasing over time (Globaldata, 2024). This increment can also be observed in building projects that are owned by private investors. When recent building projects are compared with previous buildings, the number of projects is increasing, the size is becoming larger, the number of stories is increasing, new technologies and materials are being introduced and their use is becoming multi-purpose. With this multi-dimensional growth in building projects, the growth in the capacity of the respective public bodies that are responsible for design review, construction permit and construction follow-up falls under question.

Even though the construction authority of Adama city is supposed to play a pivotal role in ensuring the successful implementation of construction projects within its jurisdiction, it is common to see various types of building faults in the construction phase of the projects, service-providing partially completed buildings and fully completed buildings. These observations of the current building project executions motivated the need to research on the design approval and project follow up processes in Adama City. Thus, this research tried to evaluate the design approval and project follow-up processes employed by the authority so as to find out the strengths, weaknesses, and areas for improvement, and ultimately to enhance efficiency, transparency, and the overall success of construction projects in the city.

### **1.3 Objective of the Study**

#### 1.3.1 General objective

The general objective of the research was to assess the process of design approval and project follow-up in Adama City construction authority .

#### 1.3.2 Specific objectives

To realize the general objective, the following specific objectives were used as its operational steps.

- To assess the current practice of design approval and project follow-up of the city, against the building proclamation, regulation and directive of the country.
- To identify the major challenges encountered by design approval and project follow-up officials and their clients.
- To forward recommendations which can be input to standardize the processes and to ensure consistency and reduce variability in outputs.

### **1.4 Research Questions**

In line with the above-listed specific objectives, the research tries to get answer to the following questions:

- Do the design approval and project follow-up process of the city according to the Building Proclamation, Regulation and Directive provisions?
- What are the challenges that design approval and project follow-up officials often encounter?
- What input factors are necessary to create clear guidelines and standardize the processes?

### **1.5 Significance of the Study**

The outcomes of this research endeavor are poised to address existing issues and foster awareness among a diverse audience, including clients, contractors, consultants, engineers, and any interested individuals. By shedding light on the current practices associated with the design

approval and project follow-up processes in Adama sub-cities and the central office, the research aims to provide valuable insights. Specifically, the research endeavors to achieve the following:

To disseminate information to clients, contractors, consultants, engineers, and the wider public about the intricacies of design approval and project follow-up processes in Adama sub-cities and central offices. To provide valuable insights to the authorities in sub-cities and central offices, enabling them to identify key challenges hindering the fulfillment of their powers and duties. The research aims to serve as a catalyst for targeted actions to eliminate these challenges. Moreover, it contributes to the collective knowledge base of the construction industry and its management by adding insights and recommendations stemming from the study. This contribution is expected to enhance the overall understanding of best practices and potential improvements in design approval and project follow-up processes. In essence, the research aspires to play a significant role in fostering positive change, promoting awareness, and enriching the knowledge landscape within the construction industry in Adama city specifically, and in Ethiopia at large.

### **1.6 Scope and Limitations of the Study**

Design approval and project follow-up processes at Adama City's Construction Authority refers to the geographical boundaries within which the study is conducted. It defines the specific locations or areas where the design approval and project follow-up processes are being assessed. This research addresses the construction office and selected sub-cities in Adama. In so doing, the scope of the study is limited to new building structures that are owned by private investors. The study involves purposive sampling, specifically focusing on two selected sub-cities.

On the other hand, in this area not sufficient published researches' have been carried out prior to this investigation and these created a limitation for the research work in terms of creating a base of literature review. This could also lead to finding other sources of information related to the topic under investigation like proclamations, directives, regulations and government reports. The Building Directive currently in action, Directive No. 2/2018, is in local language (Amharic) due to the reason that the working language of the City Government is Amharic. This caused a kind of limitation for the research in translating the provisions in the directive while undertaking review of the building legislation. While doing so, instead of making a word to word translation,

the researcher followed the translation of the provisions by matching with the provisions in the Building proclamation and regulation because these are available in both Amharic and English languages.

### **1.7 Definition of Terms**

**Building category:** a classification based on the building height and function, and can also apply for specific functions without stating the building height (Building Risk level Directive No.02/2020).

**Building officer:** a person appointed by a designated organ of the City Administration to enforce the Building Proclamation No.624/2009, Building Regulation No. 243/2011 and this Directive.

**Challenge:** "conditions, situations and tasks that are hard to inspect and require more efforts, abilities and skills to surmount the obstacles involved before success can be achieved". Wikipedia (2012) defined challenges as "difficulties that bears opportunities of development". It is also general term used in referring to "things that are imbued with a sense of difficulty and victory". Cambridge Advance Learners Dictionary (2007) saw challenges as "the situation of being faced something needing great mental or physical efforts in order to be done successfully and which therefore tests a person's ability". It is "a demanding task, call to try one's skills or strengths" (Oxford Mini reference Dictionary).

**Design review:** a milestone within a product development process whereby a design is evaluated against its requirements in order to verify the outcomes of previous activities and to identify issues before committing to - and if need to be re-prioritize - further work.

**Plan:** any drawing or model showing the extent, nature and size of a building, as well as the materials and method of assembly to be used, and may include architectural, structural, sanitary, electrical, and mechanical, fire protection and other drawings (Building Risk level Directive No.02/2020).

**Planning consent:** a document verifying the compliance of a proposed building construction plan with the city's plan, the type of permitted buildings and services prohibited, permitted heights of buildings to be constructed in a given topology, or indicating the adjacent

infrastructures, as well as the extent or size of existing and planned buildings on the area;(Building Risk level Directive No.02/2020)

**Site inspections:** a set of regular activities to check and verify the on-field compliance including Safety Standards, working conditions, and other critical areas of work site. Site inspection is being conducted and carried out using traditional methods of field visits with pen and paper checklist (Wikipedia, 2012).

An inspection involves checking something, i.e., examining and assessing something. We may inspect a building or organization to make sure that it meets specific standards. The inspectors need to ensure that nothing is faulty and that nobody is breaking any laws. They also have to make sure that whatever they are inspecting is safe.

In the world of business, inspection is the critical appraisal of materials, items, or systems involving examination, testing, and gauging. Inspectors take measurements and make comparisons. Inspections are formal evaluations or organized examination exercises.

**Legal Person:** a body of men or of property which the law, in imitation of the personality of human beings, treats artificially as subject of rights and duties independent of its component parts. The classic example of a legal person is the corporation (Encyclopedia.com).

## CHAPTER 2: LITERATURE REVIEW

### 2.1 Introduction

The construction industry plays a pivotal role by converting various resources into essential infrastructure for socio-economic development of a nation. Among the various types of constructed infrastructure, building infrastructures hold significant importance (MoUDC, 2012). “Building” means a permanent or temporary construction used for the purpose of dwelling, office, and factory or for any other purpose (*Proclamation 2(2)*). According to Ethiopian Building legislation there are three building categories (Table 2-1).

Table 2-1: Building categories according to Ethiopian building legislation

Building Category	Definition
<b>A</b>	A one-story building with a span of 7 m or less between two reinforced concrete, steel or other structural frames or any dwelling house not exceeding two stories ( <i>Proclamation 2(6), Directive 1.2.21</i> )
<b>B</b>	A building with a span of more than 7 m between two reinforced concrete, steel or other structural frames or of two or more stories not covered in category ‘C’ or a real estate development of category ‘A’ ( <i>Proclamation 2(7), Directive 1.2.22</i> )
<b>C</b>	Any public or institutional building, factory or workshop building or any building with a height of more than 12 m ( <i>Proclamation 2(8), Directive 1.2.23</i> )

The Ethiopian Economic Association delineates the activities encompassed within building construction, including the construction and maintenance of residential buildings in both urban and rural areas, as well as non-residential buildings such as factories, warehouses, offices, garages, hotels, schools, hospitals, and clinics (EEA, 2008). These building construction and maintenance activities involve a diverse array of stakeholders, emphasizing the collaborative nature of the industry. The collective contributions of these stakeholders to the development and maintenance of infrastructures are significant for the overall progress and well-being of society. In construction projects, the owner, the design professional, and the contractor play key roles in shaping the outcome of the construction process. Additionally, there are secondary players who

exert significant influence on the construction process and its outcomes, despite not having a direct contractual connection or obligation to the primary parties (Jackson, 2010). The secondary players are external stakeholders, and public agency officials are one of these parties.

A good construction project has a plan, which is the basis for developing the budget and the schedule for work. The Ethiopian Building Proclamation No. 624/2009, in Article 2(15), defines "Plan" as any drawing or model that illustrates the extent, nature, and size of a building, along with the materials and method of assembly to be used. Every decision made by the designer during the building design process carries consequences as the decisions collectively contribute to the overall impact on the construction project (Jimoh, 2016).

Thus, design review and approval is a crucial process in any construction project, as it ensures that the design meets the client's requirements, complies with the relevant codes and standards, and is feasible and cost-effective. However, design review and approval can also be a source of delays, conflicts, and rework if not managed properly. Even with a clear scope and criteria, a communication plan, and a design review checklist, one may still encounter changes in the design due to various factors, such as client feedback, site conditions, regulatory changes, or new opportunities. To follow up the project and thus manage the changes effectively, it is required to implement a change management system that defines how changes are requested, reviewed, approved, implemented, and communicated. A change management system will help control and monitor the changes, assess their impact on the project, and update the project plan accordingly.

## **2.2 Construction Project Success**

The success of construction projects holds significant importance for the economic development, stakeholders, and end-users of any country (Ramlee et al., 2016). A project achieves overall success if it fulfills technical performance specifications, meets execution goals, and garners high satisfaction with the results (de Wit, 1988). Similarly, Ashley et al. (1987) defined project success as surpassing expectations in terms of cost, schedule, quality, safety, and satisfaction of all involved parties. Research on project success often revolves around devising measurement metrics and examining specific factors influencing project outcomes (Wang and Huang, 2006). Architects may gauge success based on aesthetic performance, while

contractors may consider a project more successful if it yields greater benefits. Generally, timely completion within budget constraints and overall satisfaction of stakeholders are indicators of project success (Chan, et al., 2002).

However, Lam et al. (2008) highlight the challenge of defining success as various project participants may perceive it differently, making it challenging to objectively measure project performance. Collins and Baccarini (2004) emphasize that project success extends beyond meeting time, cost, and quality objectives; it necessitates ongoing education within the project management community. Establishing standards and criteria for development projects becomes crucial in shaping perceptions of success (Chan and Chan, 2004). Hence, achieving technical performance indicators and goals is deemed an overall success, resulting in high satisfaction from the organization, project team, and users (de Wit, 1988). Successful adherence to cost, time, and quality goals signifies direct project management success, while project success encompasses the fulfillment of the ultimate project objectives (Pheng and Chuan, 2006).

### **2.3 Construction Permit**

Construction permit means a document verifying the permission given to a person to construct a building upon fulfillment of necessary requirements (*Regulation 2(8)*). Even if buildings have the same standard plans, until they are being constructed at different locations, they must have their own separate construction permits (*Directive 2.2.5 & 10.1.3*). The issuance of a Construction Permit is a crucial regulatory step in housing development schemes, acting as a prerequisite for legal construction activities. Without mandatory consent from the relevant local authorities, housing development cannot proceed legally (Hammah & Ibrahim, 2014). The issuance of building permits is a key mechanism employed by the municipal body to exercise control over physical developments within their respective jurisdictions. The Construction Permit, therefore, functions as a regulatory green light, ensuring that developments adhere to established guidelines and receive the necessary approvals before proceeding. The granting of building permits is an administrative process aimed at ensuring controlled and planned development within specific communities (Botchway et al., 2014).

In the construction industry, consultants play a pivotal role in preparing drawings and supervising the actual execution of projects in accordance with approved plans and relevant

standards. Additionally, a third party is often engaged to oversee the project's execution, confirming adherence to approved plans and meeting all necessary requirements. According to Article 11(3) of the Ethiopian Building Proclamation No. 624/2009, a building officer is mandated to inspect all buildings under the territorial jurisdiction of the urban administration to ensure compliance with the Proclamation and other relevant laws. Building regulations, which establish minimum requirements for safe, healthy, energy-efficient, and accessible buildings, necessitate the implementation of a building control system to guarantee adherence to these standards (Jovanovic et al., 2016).

Construction permit process stands at the intersection of regulatory compliance, economic development, and urban planning. By addressing challenges, leveraging technology, and incorporating stakeholder feedback, authorities can optimize their permit systems to catalyze sustainable development, promote safety, and contribute to the creation of vibrant, resilient communities. The journey towards an effective construction permit process is an ongoing one, requiring commitment, adaptability, and a shared vision for the future of urban development.

Conversely to the aim of building permit, some developers are observed in refraining from securing a building permit. According to Botchway et al. (2014), reasons why developers ended up encouraging commencement of building projects without permits are: (a) to avoid inflation (42%) for the fear of facing land litigations, both architects and landlords indicated the desire to avoid unnecessary financial stress due to inflation rate on prices of building materials, (b) delayed permit (32%) and (c) secure land (26%). Lengthy processing durations and high cost discourage developers from applying for permits (Agyeman et al., 2016).

While maintaining its objectives, the approval process must be determinate, predictable and optimized for consistency and efficiency (Duong & Amborski, 2017). The process must be flexible and open enough to enable the industry to be innovative and competitive, and to be cost effective in meeting the necessary standards in a desired built form. Well-functioning building permit and inspection systems can strengthen property rights and contribute to the process of capital formation (Jovanovic et al., 2016).

### 2.3.1 Plan consent

Any person who is intending to have a permit for the construction of new, expansion and renovation of buildings shall secure a planning consent in compliance with the urban planning prior to preparing designs for the intended building (*Proclamation 5(1), Directive 2.1, 3.1, 3.4 & 10.1.1*). “Planning Consent” means a document verifying the compliance of a proposed construction plan with that of the urban plan indicating the type of permitted buildings and services prohibited, permitted heights of buildings to be constructed, aviation zone restriction, adjacent infrastructures, as well as the size of existing and planned buildings on the area (*Directive 1.2.9 & 1.2.10, Regulation 2(4)*).

### 2.3.2 Construction permit for building projects to be constructed fully in a period

A person intending to erect a building shall employ a qualified registered professional for each type of designs required for the category of the building (*Proclamation 26(1)*). Professionals who are employed to prepare design shall fulfill the requirements of the Regulations set by Ministry of Construction and Directives prepared by the Construction Bureau (*Regulation 19(5), Directive 2.8 & 2.9*).

Any building shall be designed in such a way that it shall not harm the safety of people moving around, other constructions, properties, and integrity of any other building or property (*Proclamation 31(1) & 34(2), Directive 2.2.1 & 2.2.14*). For assuring these requirements, any registered professional who has contracted to carry out the design work of category “B” and “C” buildings shall produce guarantee for any damage resulting from any defective work due to the design (*Proclamation 26(3)*). The amount of guarantee to be produced is based on the building category and project estimate (*Directive 25.1.6*).

## **2.4 Construction Design and Design Review**

Jimoh (2016) underscores the significance of every decision made by the designer during the building design process, emphasizing that these decisions carry substantial impact. The success of the entire plan is contingent on the designer's ability to plan effectively, highlighting the pivotal role of well-thought-out planning (Ishak et al., 2007). Furthermore, the functional aspect of design is crucial (Razak and Jaafar, 2012). A well-executed functional design not only

promotes skill, economy, and convenience but also contributes to comfort. On the contrary, a non-functional design can impede activities and escalate costs to intolerable levels.

The focus of design professionals sometimes leans towards completing projects rather than ensuring the functionality of the designed buildings (Jimoh, 2016). This perspective underscores the need for a holistic approach in which the consequences of design decisions are considered, ensuring that the ultimate outcome meets the needs and expectations of the client.

#### 2.4.1 Design deficiencies

There are three major causes of contract modifications: (1) design deficiencies; (2) user requested changes; and (3) unknown site conditions. The study found that 56 % of all contract modifications are to correct design deficiencies. The most common design deficiencies are grouped into six categories Jimoh (2016). These are:

- 1) Failure to follow well established design criteria in the choice of structural system and selection of materials.
- 2) Ignorance of the basic physical properties of the materials, e.g. failing to make allowance for the differing thermal and moisture movements of materials used in combination.
- 3) Use of new materials or innovative forms of construction which have not been properly tested in use. This is often the result of uncritical reliance on manufacturer's literature quoting simulated laboratory tests.
- 4) Misjudgment of user and climatic conditions under which the material has to perform.
- 5) Impractical or very difficult to execute design.
- 6) Poor communication between different members of the design and construction teams.

In order to deliver a complete and correct set of contract documents to the constructor, it is required to improve the efforts of all participants towards early identification and resolution of potential problems.

#### 2.4.2 The concept of design review and its elements

The establishment of a formal design review program to be conducted by qualified professionals is the most effective means of identifying deficiencies and incorporating improvements into the construction documents. The maximum potential for design reviews are realized when these

reviews are conducted early in the conceptual design stage and diminishes as the design effort proceeds toward completion. Normally, two design reviews are held: the first between 35 and 60 % completion and the second between 90 and 100 % completion.

Taiwo and Afolami (2011), in their study in Nigeria, found that 50 % of the causes of building failure are as a result of poor or faulty design and this could be checked if the building permit process was done thoroughly. There should be a design review before finally approving the design for construction (Jimoh, 2016). These reviews could be undertaken by different stakeholders who are within the building construction industry.

Reviews by private sector clients or end users to verify the design's functional compliance are often less formal. Reviews by constructors to discover problems, to resolve conflicts between the contract documents, or to identify potential savings through methods improvements are rarely conducted in the private sector except on large industrial constructions and design-build ventures. It is a major responsibility for the design team to submit the building plans to the appropriate planning, zoning, and building authorities for plan checks to make sure that the design meets all building codes and complies with various statutory regulations.

The United States Army Corps of Engineers (USACE) design review processes include technical and functional as well as BCO (Bid-ability, Constructability and Operability) reviews. Each USACE review activity is defined below.

**Constructability/Build-ability Review:** It is "the compatibility of the design with the site, materials, methods, techniques, schedules, and field conditions." Constructability encompasses issues such as: (1) ease of construction; (2) enhancement of contractor productivity; (3) adaptation of design structures and features to site conditions and restrictions; and (4) tradeoffs between standard components versus custom-designed and fabricated ones. Field construction personnel must complete this review at concept (35 %) and final (95 %) phases for each project.

**Bid-ability Review:** This pertains to the ease with which the contract documents can be understood, bid, administered, and enforced. Topics relevant to bid ability are: (1) sufficiency and accuracy of details; (2) elimination of design errors, omissions, and ambiguities; and (3) clarity, simplicity, and completeness of contract documents.

**Operability Review:** is the ease with which a facility can be operated and maintained. Issues pertaining to operability include: (1) life-cycle costs of surfaces, fixtures, components, and systems; (2) architectural compatibility with existing facilities and established master plans; and (3) adequacy of size and configuration of proposed facilities for their expected function.

**Functional Review:** The facility end user must perform a functional review of the design documents. Topics typically covered in this review focus on the selection of exterior and interior finishes, room layout and relational setting, and sizing.

**Technical Review:** Design standards are met and the design documents specify the desired level of quality for the completed project.

#### 2.4.3 Advantages of design review and building permit

Building permit approval and eventual acquisition is a measure to assess designs and ensure that the quality of development in a particular area at the design stage conforms to the given standards and building guidelines set by the Planning Authorities in that specific district (Botchway et al. 2014). The approval and permitting system was established to ensure that buildings meet public needs, satisfy local planning standards, and comply with health, safety and other objectives which are outlined in the Building Code and other applicable law (Duong and Amborski, 2017).

Constructability and design reviews at the early stages of a construction project are critical to controlling time and cost growth. These reviews identify omissions, ambiguities, and inadequacies in the design, reducing contract modifications and change orders during the construction phase and thus minimizing cost overruns. CII (1986) stated that savings on the order of 6 to 23 % of the original estimate are achievable through proper constructability review. Proper review can contribute to lower operating and maintenance costs throughout the facility service life and encourage value engineering options that might not otherwise be considered. Architect/Engineering (A/E) firms' benefit from this effort where their liability is reduced because an accurate design review lowers the risk of errors and omissions claims against them.

Due to these benefits of a formal design review, the USACERL (United States Army Construction Engineering Research Laboratory) forced that such programs be incorporated into the design phase of all construction programs.

#### 2.4.4 Challenges in design review and building permit

The challenges that could be faced in the process of issuing a building permit by having a review of the proposed design to be constructed may vary from one nation to another and may also vary from time to time. Different researchers in different countries tried to investigate the factors which act as a barrier for achieving an effective design review and building permit process. Some of them are discussed here under:

Hammah (2015), while studying streamlining of the building permit approval processing of Town and Country Planning Department (TCPD) in Ghana, outlined the challenges that are faced during building permit approvals. These are:

- i. Lack of clear reporting structure: Organizationally, there is a lack of clarity as to what tasks individual officers should be carrying out, and at whose request; there is a lack of clarity of roles; and a high degree of double handling of tasks that would be better allocated to specific positions.
- ii. Poor record-keeping system: A file could not be located or there was time wasted in locating or organizing a file.
- iii. Absence of lodgment officer: Because a dedicated & trained lodgment officer is not assigned, checking of applications on lodgment is being done by a Town Planner. This would consume the building permit reviewing time of the Town Planner.
- iv. Substandard applications: The acceptance of irregular and, substandard applications makes assessment difficult and wastes the time of both the applicant and assessing officers, as their time is frustrated through an inability to process the application.

According to Jovanovic et al. (2016), while comparing the building permit procedures in Slovenia and Croatia, figured out the main shortcomings and obstacles in the issuing of building permits in the two countries. These shortcomings are grouped based on their sources and presented under here:

- i. Shortcomings from legislation
  - Inadequate building permits legislation
  - Mutually uncoordinated and overly complicated legislation
  - Excessive regulatory requirements of environmental legislation.

- ii. Shortcomings from the building permit procedures
  - Complicated verification procedures;
  - Long-lasting procedures due to side participants;
  - Unreasonable requirements to investors from Pre-approval authorities (environmental department or utilities).
- iii. Shortcomings from government officials
  - Lack of officials' technical knowledge
  - Officials confusing and uncoordinated interpretation of legislative acts
  - Increased possibility of official errors due to the extensive legislation
- iv. Shortcomings from designers and permit application
  - Lack of project designers' legal knowledge
  - Incomplete and not professionally prepared applications
- v. Shortcomings from zoning maps
  - Non-compliance of physical plans/zoning maps with new regulations;
  - Zoning maps are too complicated and unavailable in electronic form
  - Outdated zoning maps that do not allow modern constructions;
  - Uncategorized local roads.
- vi. Shortcomings from the relationship between authorities at different level
  - Weak relationship between local and central authorities;
  - Specific rules for zoning maps enacted by local authorities (uncoordinated with national plans and guidelines);
  - Unresolved issues concerning the responsibility of administrative unit departments and municipal authorities.

Based on an extensive research on the challenges in the processing of building permits in Ghana, Agyeman et al. (2016) identified six main challenges of the building permit process and these are described as follows:

**a) Lack of Co-ordination Between the Land Agencies and Local Authorities**

Before a building plan is approved, several agencies are involved to ensure appropriate clearances. The lack of coordination between land agencies and local authorities at various levels of land development leads to the absence of planning permission in many old and emerging communities

**b) Bureaucratic Delays**

Bureaucratic delays in building permit procurement lead to increased cost of construction and loss of value. And this would discourage developer from applying for permits. Shortening the time period for granting permits and reducing the number of signatories needed for permits are required (Agyeman et al., 2016).

**c) Data Accessibility for the Processing is Difficult**

If data integration has been done properly and systems are working, data is deployed having the following themes: layout scheme (parcel information), land use, land area, topographical maps, cadastral plans, soil maps, and another relevant field information.

**d) Inadequate Number of Staff**

In Ghana, the number of building permit processing officials is inadequate and their capacity is not strongly built.

**e) Technological Challenges**

Effective and efficient use of information technology can reduce the regulatory cost of construction. The adoption of ICT is one of an effective way to achieve integrated approach to the processing of construction permits and ensure efficiency in the internal operations of permit issuing authorities (Kpamma & Adjei-Kumi, 2013). Electronically linking stakeholder organizations like the Municipal Assembly, Lands Commission, clients/general public are effective ways of achieving the proposed integration.

**f) Financial Constraints**

To improve the performances of the agencies who participated in building permit service delivery, drastic investments in ICT and capacity building for workers must be carried out. And

financial resources required to develop the agencies capacity, introduce modern technologies, purchase logistics, and the like were lacking. Planning officers perform poorly due to several external and internal constraints and one of the major constraints is the lack of funds (Hammah & Ibrahim, 2014).

#### 2.4.5 Delay in design review and building permit

Duong and Amborski (2017) in their study on Modernizing Building Approvals in Ontario (Canada) raised a question for building permit applicants whether they felt that their projects were delayed due to the length of any of the required approval processes. 78% of the respondents felt that their projects were unnecessarily delayed. According to Hammah (2015), lengthy timeframes in approvals are creating a delay perception among the public and are worsening the existing lack of confidence in the system.

In Ghana, due to the lack of confidence in the planning system, a difficult situation is being created whereby everybody builds whatever they want whenever they want. Subsequently, the bypassing of the approvals system is resulting in unauthorized structures of substandard quality and careless workmanship which have been shown to lead to the collapse of buildings (Hammah, 2015).

Different researchers imply different reasons that can cause delay in design review and building permit approval process. Policies and regulations are intended to work together to help promote public safety and welfare (Duong and Amborski, 2017). They seem to work individually when they create confusion through conflicting comments in building plans. And this ultimately creates delays in the overall building approval process. Organizational workflow problems and lack of modern technology have been framed as predominant reasons as to why the planning application process is perceived to have unwarranted delays (Karikari et al., 2005). According to Hammah (2015), to lodge a planning application at the TCPD, one has to follow over 10 complex steps and it is this complex system that creates unnecessary delays. According to Botchway et al. (2014), common reasons for delayed building permits are: bad working drawing (55%), land rights (18%), incomplete layout (18%) and breaches (9%). Public complaints and criticisms are, to some extent, unfair, since a considerable proportion of the delays are the fault of the applicant himself.

## **2.5 Project Follow Up**

Usually consultants in the construction industry are responsible for the preparation of drawings and supervision of the actual execution of the project as per approved drawings and other relevant standards. In addition to consultants neutral third party is required to follow up the execution of a given construction project in order to confirm the project is being executed as per earlier approved plans and all other requirements have been met. Art 11(3) of the Ethiopian Building Proclamation No. 624/2009 states that a building officer shall inspect all buildings under the territorial jurisdiction of the urban administration to ascertain conformity with the Proclamation and other laws.

Building regulations set minimum requirements for safe, healthy, energy-efficient and accessible buildings. To guarantee that these requirements are met, a building control system is vital (Jovanovic et al., 2016). The monitoring unit of the building inspectorate division is responsible for ensuring that developers comply with building drawings submitted during the permit acquisition process, and report any unauthorized structural development within their area of jurisdiction to Municipal Planning Authorities (Agyeman et al., 2016). The common reasons for stopping ongoing projects are: lack of building permit (55.4%), unapproved drawings (11%), wrong orientation of building (15.5%) and alteration of drawings without approval (9.1%) (Botchway et al., 2014).

The main challenges to project follow up are briefly given below.

### **i.Lack of Logistics**

Building inspectors are expected to inspect as many buildings as possible that are being constructed (Botchway et al., 2014). He revealed that lack of working logistics is the main challenge for inspector by contributing the highest (58%). Based on this the availability of transportation in the form of motor bikes will aid faster inspection of buildings in various localities and provision of logistics such as Global Positioning System (GPS)/Geographic Information System (GIS) will facilitates access to data.

### **ii.Insufficient and Inefficient Staff**

According to Agyeman et al. (2016) Since number of the monitoring unit of the building inspectorate division is small and their capacity is not strongly built, most of field inspection

and monitoring activities are irregularly done, leaving most illegal developments unnoticed. These challenges are actually serving as a root for the increasing of illegal structures in most cities in the country. In line to this, Botchway et al. (2014) identified that insufficient and inefficient staff to be the second and the third challenges of the inspectorate divisions by accounting 22% and 5% respectively.

### **iii. Corruption**

In a report by Asante (2012) as cited by Botchway et al. (2014) noted that officials in various organizations are paid to ensure compliance with rules and regulations before licenses are granted for the erection of buildings. Some officials did was to paint notices of “stop work or produce permit” on structures being constructed. Owner of the structure then sees the concerned official and pays bribes and official turns a blind eye on the illegal construction.

The National Construction Authority (NCA) in Kenya is mandated to streamline the construction sector by ensuring that all construction activities are conducted according to the NCA regulations. However, the establishment of the NCA does not cease the cases of collapsed buildings which led to lose of lives and property. This is happening under the watchful eyes of the NCA. Cases of bribery during NCA site inspection visits have also been noted (Gacheru, 2015).

## **2.6 Regulatory Framework in the Construction Industry**

Regulation in general is a law, rule, or other order prescribed by an authority, especially to regulate conduct (Gacheru, 2015). Regulatory framework is the appropriate process of regulation surrounding a single topic that entails all of the relevant legislative documents (acts, regulations, annexes, policies, standards, directives and guidelines) and describes the agency responsible for administering the framework (Njoroge, 2013).

### **2.6.1 Construction industry regulations**

Construction regulations are statutory instruments setting out the minimum legal requirements for construction works which must be taken into account when planning construction operations and during the actual construction period (Ruya et al., 2017).

Construction rules and regulations are means for governing the building industry to successful project delivery and they include Environmental Laws, Health and Safety, Environmental Impact Assessment, Approval Processes, Construction and other ethical practices. Construction regulations must incorporate a provision for the request of building permits during construction planning (Ruya et al., 2017). Additionally, it shall have a legal capacity to accuse disobedient developers who followed unsustainable construction practices, cause loss of life and depletion of non-renewable resources.

Because building legislation is complex research field, it is still in its infancy and requires multidisciplinary approaches of engineering, economy, sociology, environmental protection, law and even philosophy (Jovanovic et al. 2016).

#### 2.6.2 Benefits of construction regulation

In the context of the construction industry, the fundamental purpose of building control was originally the protection of the public interest with regard to health and safety. The scope has however been extended over the years to include the welfare of people in and around building and furthering the conservation of fuel and power. Effective and balanced regulation of construction sector activities is vital for protection of the public interest on one hand, and the promotion of economic development on the other (Jovanovic et al., 2016).

There is no doubt that the Building Code and Building Code Act are important as they safeguard the general public and help to protect the natural and built environment (Duong and Amborski, 2017). Regulatory framework in which regulators challenge firms to improve based on constructive and active engagement can be effective in ensuring compliance before a serious problem emerges.

#### 2.6.3 Construction regulation authorities

Construction regulation authorities are established to control and enforce the mechanisms on the application of the Building Code in the construction industry, improve on the bureaucratic requirements and procedures in approval of building plans, reduce uncontrolled and unchecked physical planning of buildings and construction, prevent easy entry and penetration of unqualified contractors, and revise the Building Codes to ensure relevance (Gacheru, 2015). If

there is no commitment from the authorities to implement policies and procedures for achieving quality, the likelihood of the success of those policies in the future would be limited.

#### 2.6.4 Problems in regulations

##### **i. Unsound Regulation**

Unsound regulations arise because regulations are often not well-written (Ruya et al., 2017).

##### **ii. Complex Regulations**

Complex and expanding regulations create barriers to entry, and they can reduce competition by favoring those firms that have become familiar with the complex regulatory requirements (Duong & Amborski, 2017). Moreover overly complicated construction rules can increase opportunities for corruption and rent-seeking (Jovanovic et al., 2016).

##### **iii. Innovation Inhibiting Legislation**

Applicants must comply with existing legislation as part of the building approval process before a building permit can be issued (Duong & Amborski, 2017). With this prescriptive and often long process, innovation in the development process falls under question.

##### **iv. Too Many Legislation**

While it is generally admitted that a reasonable amount of regulation is essential for preservation of public wealth and the environment, the presence of an ever larger volume of regulations is becoming a source of dissatisfaction. Designers criticize to the restrictions it imposes on their creative freedom, builders complain of the delays and additional costs it entails, and the industry in general regards it as a limit on development.

#### **2.7 Reforming the Building Permit Process**

Builders want to comply with reasonable requirements, and their main request is to have clear information about the requirements, the process, and the decision-making criteria (Duong and Amborski, 2017). Building Permits are generally seen by the public as a document difficult to obtain from the appointed agencies (Botchway et al., 2014).

Duong and Amborski (2017), in their research presented a question for the respondents on what area in the building approval process needed the most improvement from among the four themes

(building permit timelines, building permit procedures, building permit information, and building innovation). Most applicants wanted to see improvements in the building permit timelines and procedures indicating these areas require greater attention. Areas of the building permit process that needs serious reform are gathered from the literature search and described here under:

### **i.Awareness Creation**

There is a need for the Planning Authorities to create awareness about the issues regarding approval and also educate stakeholders for the need to acquire permits before constructing a building project commences (Botchway et al., 2014).

### **ii.Providing Information for Applicants Prior to the Start of the Approval Process**

All concerned government agencies would need to clearly document on a web site what constitutes a complete application. Having this information readily available and accessible would eliminate the need for an applicant to travel to an applicable law agency and wait to speak with a staff member (Duong & Amborski, 2017).

### **iii.Undertaking Pre-Application Meeting**

Applications for complex building projects would require pre-application meetings at which the applicant would meet with all planners and staff from various agencies to establish what would constitute a complete application (Duong & Amborski, 2017).

## **2.8 Ethiopian Building Legislation**

With regard to the provision for design approval; construction permit and project follow up, the building legislations are given in Table 2-2. For the purpose of indicating from which legislation and article a certain statement/s have been quoted, statements in the paragraph are followed by brackets containing the specific name of the legislation and article. To avoid iteration and for the purpose of convenience a statement taken from the:

- Building Proclamation No. 624/2009 is denoted by “**Proclamation**”
- Building Regulation No. 243/2011 is denoted by “**Regulation**”
- Building Directive No. 2/2018 is denoted by “**Directive**”

**Table 0-2:** Lists of reviewed legislation

No.	Reviewed Legislation	Enacted By
1	Proclamation No. 624/2009: Ethiopian Building Proclamation	Federal House of Peoples Representative (HPR)
2	Regulation No. 243/2011: Building Regulation	Council of Ministers

### 2.8.1 Building officer

A mayor of the urban administration appoints building officer in order to enforce the Building Proclamation, Regulation & Directive. He/she is accountable for his/her appointer and the appointer shall take necessary measure on Building Officer who did not comply with rights and duties given to him/her by the Building legislation (*Proclamation 11(7) & 11(8), Directive 1.2.18, 11.1 & 11.6*).

The Building Officer may delegate another body to carry out review of plans & inspection of works for which he is incapable of undertaking (*Proclamation 12(1) & (4)*). With regard to educational and professional qualification, he/she shall be at least a holder of Bachelor of Science degree in Architecture, Civil Engineering, Construction Technology & Management or related fields and should have the required work experience related to review of plans or inspection of works. In addition, he/she should have remarkable job performance, good ethics, free from alcohol and drug addictions, good communication skills and should have the ability to plan, arrange, coordinate and lead (*Directive 11.1 & 11.2*).

The powers and duties of the building officer are given below.

#### **a) Before Commencing Construction**

The Building Officer approves plans and documents of the building that comply with the urban plan, Ethiopian building standard, building Proclamation and other laws. And will reject plans that do not fulfill the standards (*Proclamation 11(2), Directive 5.1 & 6.1*).

#### **b) During Construction**

The Building Officer shall inspect all buildings under the territorial jurisdiction of the urban administration to ascertain conformity with the building Proclamation, Regulation, Directive

and other laws. He/she may order for the stoppage, rectification or demolition of the structure if buildings under construction do not fulfill standards. Once after the building officer imposes administrative fines and confirms the rectification, he shall grant a decision of construction continuation (*Proclamation 11(3), Directive 11.3-11.5*).

**c) After Completing Construction**

The Building Officer shall grant occupancy permit for buildings that are fully completed and ready for service and also for partially completed buildings by assuring the building is not risky (*Regulation 16(1), Directive 19.5 & 19.14*). If a visible crack, sink or tilt is observed on a building that is erected on or before the effective date of the Proclamation or exempted buildings for the purpose of national security, the Building Officer shall order inspection of the building and take the appropriate corrective action (*Proclamation 2(10), 11(5) & (6), Regulation 10(2) & (3), Directive 11.7*).

**2.8.2 Presentation of design and related documents**

Designs and related documents submitted for approval shall be in the following format (*Directive 2.2.6-2.2.12*).

- Design and related documents shall be in the administration's working language (Amharic) or in English language;
- Plan measures shall be in metric system;
- Designs are submitted in 3 copies, from a size of A3 up to A1 as required. It shall be either in blue print or in 80 gm white paper;
- Written format documents shall be in A4 paper;
- Detail descriptions that can't be described in sketches shall be described by writing on the design;
- If the highest horizontal length of the floor is less than 30m, the plans and the site plan shall be presented in a scale of 1:50 and 1:200 respectively. And if the highest horizontal length of the floor is greater than 30 m, the plans and the site plan shall be presented in a scale of 1:100 and 1:500, respectively;
- Detail plan shall be prepared and presented in a scale of 1:10, 1:20, or 1:25.

### *2.8.2.1 Design review period*

Any building plans shall be reviewed within the time period set for each building category. The time for review of each category shall begin to be counted from the time of submission of the plan (Directive 4.1, Regulation 6(3)). Average time required for reviewing Architectural, Structural, Electrical, Sanitary and Mechanical designs of different building categories have been clearly stated in (Directive 4.2.1, 4.2.2, 4.2.3 & 4.5). The building officer may request the urban administration additional time to review huge or complex projects (Regulation 6(4), Directive 4.3).

### *2.8.2.2 Design review fee*

The plan review fee calculation for different range of the project estimates have been clearly shown in (*Regulation 24(4), Directive 20.1.1*). Where:

Project estimate = Total area of the building (m<sup>2</sup>) \* Construction cost per square meter (*Regulation 24(4), Directive 20.1.1(4)*)

- Construction cost per square meter = Average current unit price per meter square for each category of buildings prepared by the building officer on the basis of the construction price prevalent in the specific urban center (*Regulation 24(5), Directive 20.1.1(5)*).
- For identical blocks: Total project estimate = Project estimate for a single block + {10% \* [project estimate for a single block \* (n-1)]}; where n is the number of blocks (*Regulation 24(7), Directive 20.1.1 (7)*).

### *2.8.2.3 Design review decision*

#### **i. Approval of Plans**

The Building Officer approves plans and documents, after checking the compliance with the urban plan and Ethiopian building standards. Upon approval, two sets of application forms and accompanying plans, signed and stamped “APPROVED” on the first copy and “FOR INSPECTION ONLY” on the second copy, shall be returned to the applicant and the third copy shall be stamped "REMAINDER" and retained with the applicants file (*Proclamation 6(1), Directive 5.1*). The plan approval fee for all categories of buildings shall be 10% of the plan review fee (*Regulation 25, Directive 20.1.1(11)*). The Building Officer may approve plans with

comments provided that the comments refer to minor non-compliance and if the required rectification work can easily be carried out during construction (*Proclamation 6(2)*).

## **ii.Rejection of Plans**

Building plans that do not comply with the provisions of the Building Proclamation, Regulation, Directive and Ethiopian building standards shall be rejected by the Building Officer (*Proclamation 8(1), Directive 6.1*). However Approval of plans shall not be withheld on account of requirements not included in the Proclamation or other laws (*Proclamation 6(1)*). Upon rejection of submitted plans, the breached provision of the law and detail written explanations about the comments shall be provided (*Proclamation 8(2), Directive 4.4 & 6.2*). Where rejected plans are re-submitted for approval, additional review fee shall be 25% of the first payment. If the plan was rejected due to overlook in the review of the previous plan, no plan review fee shall be paid to review the resubmitted plan (*Regulation 24(8) & (9), Directive 20.1.1(8) & (9)*).

### 2.8.3 Validity period of plans and construction permit

#### **i.For Un-Commenced Construction Works**

The validity of approved plans and construction permit shall expire after six months from the date of issuance where construction work has not been started. Upon expiry of the validity period before the commencement of construction, until earlier given construction permit complies with the current urban plan laws, regulations and other related requirements, the applicant can request for extension of the validity period by filling “Construction Commencing Extension” form (*Proclamation 10(1), Directive 9.2.2*).

The request for the extension of the validity period may be accepted for the delay reasons of: the existence of a border conflict, a conflict of possession right, an apparent lack of construction materials, force majeure, or the urban administration failed to fulfill the necessary infrastructure, or failed to clear the existing infrastructure which prevented the construction (*Regulation 7(1) & (2)*).

#### **ii.For Un-Completed Construction Works**

Unless an agreement is set between the urban administration and the applicant regarding to the construction commencing and completion time, an approved and issued plan is valid: (1) For one year for one floor single dwelling building (lower level construction), (2) For three years

for four floor and below single dwelling building (medium level construction) and (3) For five years for any public/institutional building (higher level construction) (*Directive 9.2.1 & 9.3*). If basic construction works (i.e. Structural frame, internal and external wall work, external door and window work and roofing work) are not completed within the validity period, the applicant shall fill the “Construction Time Extension” form and request for approval by the Building Officer (*Directive 1.2.14 & 9.1*). The request for validity period extension may be accepted for the following reasons if they were timely reported in writing to the Building Officer (Regulation 7(3)):

- If there exists an apparent lack of construction materials at national level
- Where a revision in the design was necessary during construction period resulting from an error which was unforeseen during the design period
- Where the completion of such construction takes more than five years
- Where there exists pending court case that prevents the construction work

#### *2.8.3.1 Cancellation of building permit*

Any construction permit can be cancelled when it is discovered that: (*Directive 8.6.1-8.6.4*):

- The design is mistakenly approved having oversight
- Fallacious information included in the construction permit application
- The construction results environmental pollution beyond the acceptable limit
- The construction is being undertaken beyond the approved plan

#### *2.8.3.2 Additional permits*

##### **a) Permit for Constructing a Building in Separate Phases**

In order for approving a building design to be constructed in separate stages/phases, the first construction phase shall fulfill at least the lowest criteria on the urban plan and shouldn't be lower than the lowest building height set for the area. For making inspection and occupancy permit more convenient, part of the building planned to be constructed in stages/phases shall be clearly shown in the construction permit document. And the owner/contractor should notice to the building officer before commencing the next phase of work (*Directive 5.4.1, 5.4.3 & 5.4.6*).

In the process of constructing a building in segments/phases, the contractor shall take appropriate measure for protecting people moving around. In addition services provided in

earlier completed parts of the building should be terminated. If undertaking construction is required without terminating the provision of services, it should be assured that basic structural parts of the building are completed and construction of outer wall work doesn't abuse the activity in the area (*Directive 1.2.14, 5.4.4 & 5.4.5*).

**b) Permit for Constructing on Boundary**

Any one requesting for a construction permit shall bring correct information about the buildings located at his neighbors regarding to the number of floors above & below the ground, distance from common boundary and depth from the ground level. The information shall be provided by making the neighbor to fill and sign on the "Notice for Construction on Boundary" form. If the neighbor is unwilling to fill the form, the Building Officer is responsible for making the neighbor fill the form.

And if the neighbor still refuses for the Building Officer, the Building Officer by himself assures that the planned construction doesn't affect the rights of the neighbor and approves construction on boundary without the consent of the neighbor. However, to construct a building adjacent to free space where no structure is built, notice to the neighbor is not required (*Directive 2.5.12, 10.2.1 & 10.2.14*). If the neighbor claims for the Building Officer that the information given about the boundary construction is incorrect, the Building Officer shall explore the claim in relation to appropriate information and decides within five working days or less (*Directive 10.2.2*).

**c) Permit for Plan Revision during Construction**

Plan revision means an expansion or revision of an existing plan without causing full revision of the requirements and descriptions (*Regulation 2(5), Directive 1.2.13*). Where need arises to modify the original plan during construction, the modified plan shall be prepared and submitted to the Building Officer for approval prior to implementation. If modification is made without approved plans, the Building Officer may order rectification on such modifications and may suspend all works on such building until the owner complies with the order (*Proclamation 14(4)*). The review fee for modified plans shall be 25% of the payment made for a new plan. However, where the plan modification requires changing the structural plan, plan review fee payable for the modified plan shall be equivalent to that payable for a new plan (*Regulation 24(10), Directive 20.1.1(10)*).

**d) Permit for As-Built Modification**

Any person requiring for As-Built revision permit shall submit the design revision documents together with the requesting form. Average time period required for reviewing Architectural, Structural, Electrical, Sanitary and Mechanical As-Built drawings is clearly indicated in the *(Directive 4.5)*.

**e) Permit for Nighttime Construction**

If a construction activity is to be carried out at night, from night 1pm up to early morning 12am local time, night time construction permit shall be requested *(Regulation 29(2), Directive 10.8.1)*. Up on fulfillment of the standards, nighttime construction permit shall be issued for three months. If the applicant fails to complete the work during the permitted period, it shall be postponed for one additional month without additional charges. The building officer shall provide all the necessary support upon fulfillment of the following required standards *(Directive 10.8.2, 10.8.4, 10.8.5 & 10.8.7)*.

- Do not cause nuisance to the public
- Do not orientate for the development of illegal construction
- Do not require the building inspector's supervision
- Should be assured that stop order or construction stoppage warning is not issued
- Should have a nature of causing higher burden on people and vehicular activity if accomplished during the day time
- Should not be boundary construction

**2.8.4 Project follow up and inspection**

*2.8.4.1 Preparations for commencing construction*

A person intending to erect a building shall employ a registered contractor with the necessary qualification for the category of the building in question and a qualified registered professional for supervising the erection *(Proclamation 26(1) & 27(1), Directive 25.1.1, Directive 25.1.4 & 26)*. The level of registered professionals employed for supervision and registered contractors for under taking the work shall be determined by directives on the basis of project prices and building categories *(Regulation 19(5) & 20(4))*.

Any building shall be constructed in such a way that it shall not harm the safety of people moving around, other constructions, properties, and integrity of any other building or property (*Proclamation 31(1) & 34(2), Directive 2.2.1 & 2.2.14*). For assuring this, any contractor who has contracted to carry out category “B” and “C” buildings shall produce a guarantee for any damage resulting from any defective work due or negligence (*Proclamation 27(2)*). The amount of guarantee to be produced based on the building category and project estimate are clearly shown in (*Directive 26.8*).

Furthermore, when the urban administration believes that the erection or demolition of a building may cause any harmful effect on its property, it may require the owner of such building to make such deposit or give such security as it may be required to cover the costs of the repair caused by such work (*Proclamation 32(2)*).

A Building Officer requested for construction commencing permit with all the requirements being fulfilled, after undertaking site visit to check that no permanent building exists in the intended construction area and existence of boundary marks/pegs, shall grant construction commencing assurance certificate to the applicant (*Directive 14.1.3, 14.1.4 & 14.1.7*). The following documents shall be placed in a plain location at the construction site until the completion of construction: (1) Construction permit set of documents marked with “INSPECTION ONLY”, (2) A copy of the contractor’s work permit and (3) A site book (*Regulation 14(1), Directive 8.7, 14.1.8 & 26.6*).

#### *2.8.4.2 Regular follow up and inspection*

Any person who has an approved plan for category “B” and “C” buildings shall notify to the building officer with “Construction Activity Stage Notice” form, the starting date of each stage of work before five working days of such date. The building officer shall inspect the site within 5 working days and ensure that the construction of such stage is in compliance with the permit (*Proclamation 15(1), Regulation 13(1) & (5), Directive 16.1, 16.2, 16.4,*). Work stages requiring notice to be made are (*Regulation 13(2), Directive 16.3*):

- On completion of surveying work for foundation but before commencing excavation
- On completion of excavation for foundation and placing foundation formwork and reinforcement bars at their location

- On completion of placing ground floor bars, sewer lines and hardcore
- Ground floor column bar and formwork activities are completed
- On completion of each storey's reinforcement bar work, sanitary & electrical installation, form work and each storey's column bar and formwork activities
- During testing of completed water supply ,sanitary, electrical and electro mechanical installations
- On completion of roofing slab or before roofing cover activity is carried out
- Other stages of work required by the building officer based on the type and method of construction

#### *2.8.4.3 Sudden follow up and inspection*

Inspectors carrying an urban administration's badge identifying them shall be permitted to access and inspect any building completed or under construction at any working hours or at any hours where construction activity is undertaken. The inspector shall report to the Building Officer about the item of works inspected, result obtained & order given by using "Construction Follow Up" form. And also shall communicate the same to the building owner or for his appointee by filling, signing and making them to sign on the site book. Any order or notice shall be given in writing. An order given orally is invalid (Proclamation 16(2), Regulation 13(6), Directive 17.1, 17.2 & 17.4).

#### *2.8.4.4 Follow up and inspection for ascertaining quality of building materials*

Concrete samples shall be taken for each stage of concreting work activities; the concrete samples shall be tested by licensed laboratories based on their ages and the results shall be communicated to the inspecting organ (*Directive 18.6*). The Building Officer may order tests to be performed, to check the quality of a material used or intended for construction.

If the sample testing is found to be defective/below standard, the Building Officer may order its removal/adjustment in its use (*Regulation 15(1), Directive 18.1*). The Building Officer may require test certificates for local or imported materials (*Directive 18.5*). Any contractor or consultant or owner before supplying finishing materials like glasses or floor finishes, shall bring a copy of competence certificate from the concerned organ ascertaining that the intended finishing material fulfills required standards (*Directive 19.13*). Newly invented construction

materials shall be used only if the concerned organ ascertains that the material complies with all Ethiopian building standards (*Directive 18.7*).

#### *2.8.4.5 Construction follow up and inspection decision*

The builder after noticing the regular inspection stages of construction level for the concerned organ shall proceed to the next stage of work if assured by the inspector that all the requirements from the Building Proclamation, Regulation, Directive and all other related laws and agreements are fulfilled (*Directive 16.6 & 17.3*).

If the builder doesn't conform to Building legislation, the Building Inspector issues the "Construction Stoppage Warning" form for correcting the breaches (*Directive 15.2 & 15.3*). A person who has received an order to rectify certain works shall give notice to the Building Officer in writing on completion of such rectification work (*Proclamation 15(4), Regulation 12(3)*). If the owner of a building fails to rectify the condition under which construction works carried out beyond the approved plan, after receiving "Construction Stoppage Warning" form, the inspector may suspend such construction works by "Stop Order" form and reporting to the Building Officer (*Proclamation 16(3), Regulation 12(2), Directive 17.3*).

The Building Officer shall, upon receipt of the report and the "Stop Order" form, specify the provision of the laws so violated, the period within which the rectification, removal or demolition of such building is to be carried out and communicate the same to the owner in writing within five working days. The period to be specified shall take into account the critical nature of the order to the progress of construction and the sequence of works. *Proclamation 16(3) & (4), Regulation 14(5)*

Where the owner of a building proceeds the construction activity with failure to execute an order within the specified time period, the urban administration may cause the work to be rectified, removed or demolished by himself and claim the incurred expenses from the owner (*Proclamation 14(2) & 16(5)*). The urban administration may impose administrative fines on persons who violate the provisions of the Proclamation but this does not relieve the offender from complying with the requirements of the Building legislation and other additional legal and corrective measures to be taken (*Proclamation 23(1) & (2), Regulation 44(4)*).

The Building Officer may order a building constructed without approved plans to be demolished, if the plans utilized to construct such building does not comply with the Proclamation or other laws. In addition the Officer may order any work or parts to be opened for inspection, removed or, without causing damage to the building, demolished if such work has been carried out without the required notice being given (*Proclamation 14(1) & (3)*). The Building Officer shall grant construction continuation decision after ascertaining that all the required rectification measures have been taken by the builder and appropriate administrative fines and legal measures are applied (*Directive 11.5*).

#### *2.8.4.6 Follow up and inspection service fees*

For building category “B” and “C”, when the owner notifies for the beginning of the stage of work to be inspected, inspection fee shall be paid (*Directive 14.1.6, 20.1.2.1 & 20.1.2.6*). The fee payable at each inspection visit and one stage of inspection is ETB 400 and ETB 800 for Category “B” and “C” buildings respectively (*Regulation 26(2), Directive 20.1.2.5*).

Because follow up service fees are for stages of work where regular follow up and inspections are required, no follow up service fee is made for sudden site inspection by the building inspector (*Directive 20.1.2.2 & 20.1.2.3*). A copy of the service fee receipt shall be placed in the construction permit file at the urban administration (*Directive 20.1.2.7*).

## **2.9 Empirical Literature Review**

Botchway et al. (2014), found out the common reasons for delayed building permits to be bad lack of building permit (55.4%), unapproved drawings (11%), wrong orientation of building (15.5%) and alteration of drawings without approval (9.1%), working drawing (55%), land rights (18%), incomplete layout (18%) and breaches (9%). They identified that insufficient and inefficient staff to be the second and the third challenges of the inspectorate divisions by accounting 22% and 5%, respectively. Taiwo & Afolami (2011) also found that 50 % of the causes of building failure are as a result of poor or faulty design and this could be checked if the building permit process was done thoroughly. Some other cases are given already.

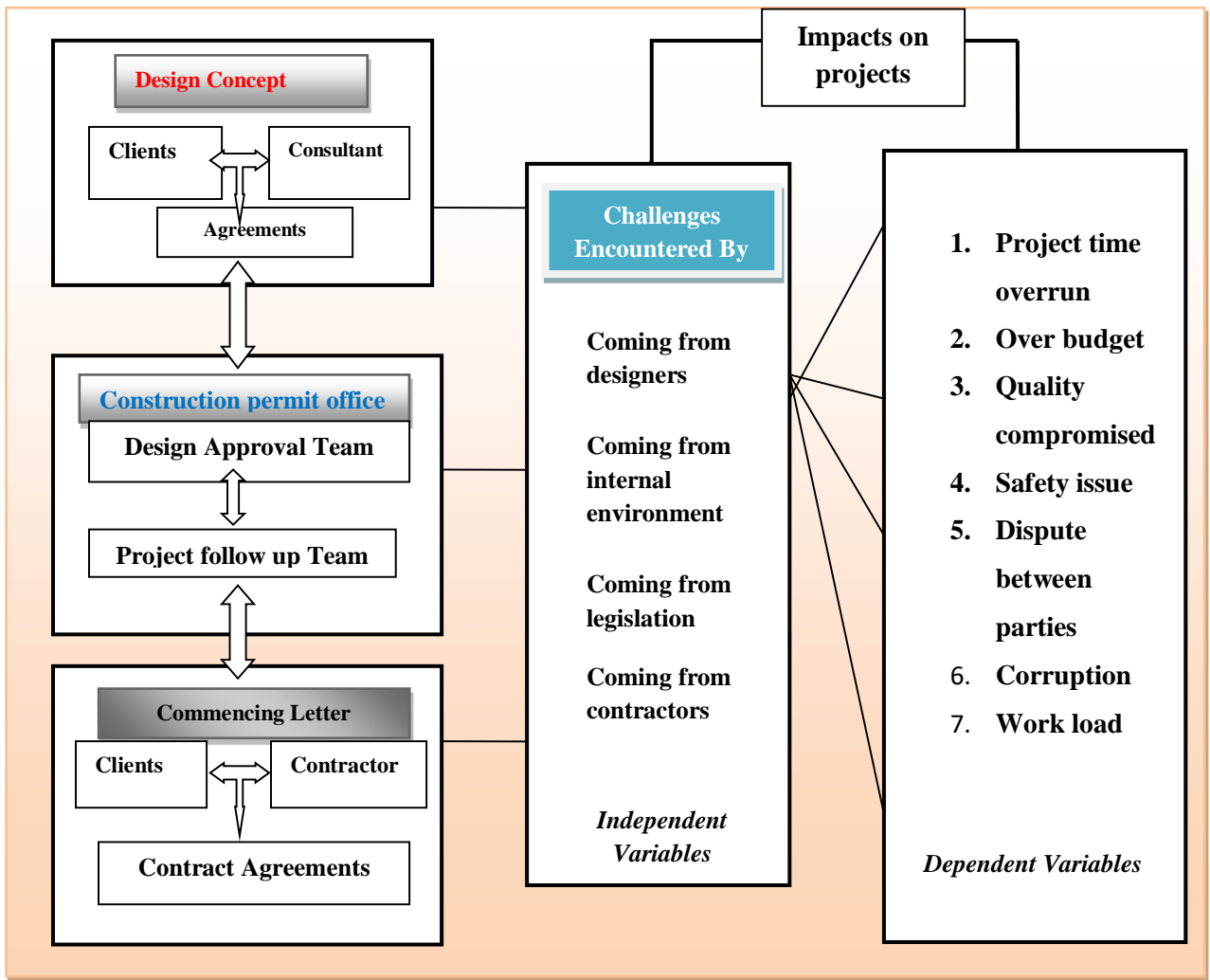
Based on the empirical literature review, research gaps have been found in the areas of the major components formulating design review and project follow up process and the requirements of

those processes. Moreover, the researcher was unable to find a research literature undertaken locally in the stated subject. Since design review and project follow up processes are subject to vary from one country to another based on the governing construction regulations of that specific country, absence of a locally undertaken study on the stated subject matter is also assessed to be a research gap.

## **2.10 Conceptual Framework**

The conceptual framework was developed by the researcher based on the information gathered through interview with team leaders of both design approval and project follow up within the selected sub cities and also based up on the review of the building legislation with regard to construction permit and project follow up. The diagram (Figure 2.1) clearly dictates the steps to be followed in the design approval, construction permit and project follow up process throughout the project life cycle from infant stage of planning consent to the late stage of occupancy permit.

And the challenges faced in any of the process in starting from project design up to completion. Challenges emanating from designer point of view challenge from legislation and challenges coming from internal environments and external environments. The impacts of these challenges to project performance are project time overrun, over budget, poor quality, disputes between parties and corruption.



**Figure 2-1:** Conceptual framework of the study

## CHAPTER 3: MATERIALS AND METHODS

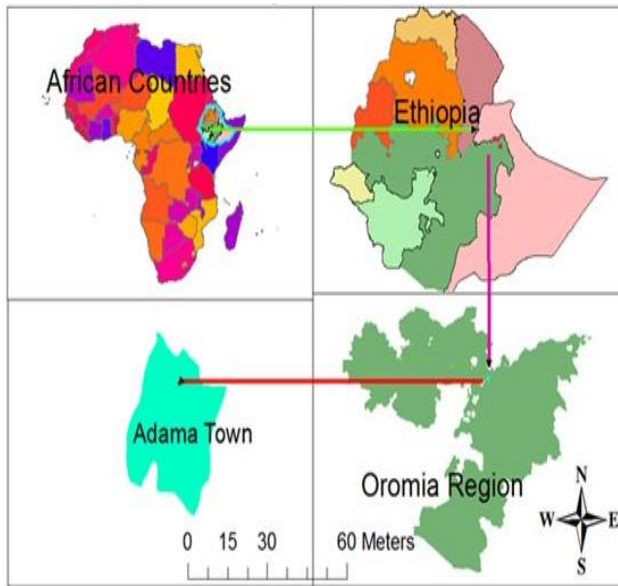
This chapter gives the details on the methodology that was employed in acquiring and synthesizing the study data to answer the research questions. It specifically presents the study design, study area, target population, sampling, data collection techniques, content and design of data collection instrument, pilot study, and data analysis methods.

### 3.1 Description of the Study Area

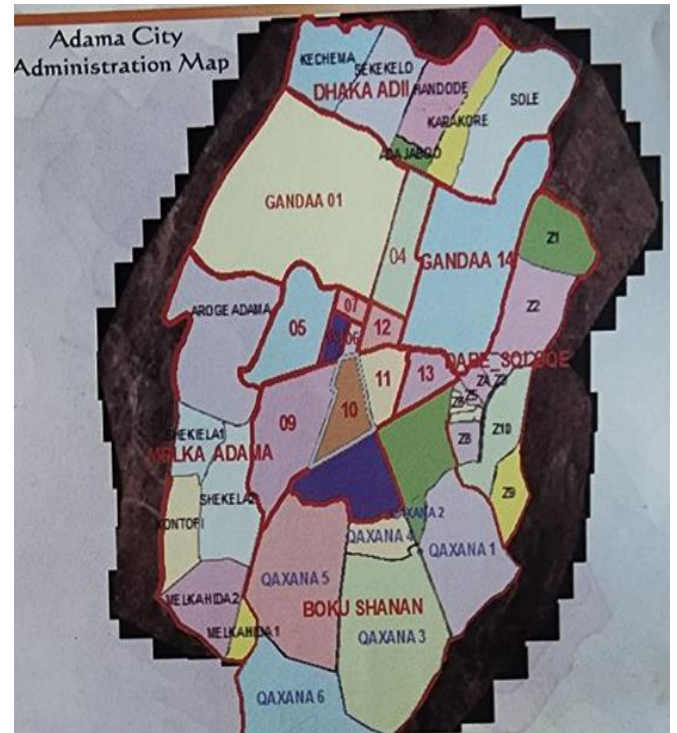
Adama City was established in 1916. It has opportunities for potential development and growth. Some of these potential opportunities are its proximity to Addis Ababa and existence of expressway connecting the cities, transportation facility, such as the railway to Djibouti and the highway to Harar, Afar Region, Dire Dawa, Arsi and Bale Zones, pass through Adama, surrounded by Agricultural productive districts and the hot springs around the city make it center of recreation and tourist attraction. On the other hand, there are two potential threats for its future development as the city is located in the rift-valley lowlands between chains of plateaus which make it open for flood and it is also inside the seismic volcano areas.

Historically, Adama City's growth is linked with the establishment of Djibouti–Finfinne railway; since then Adama has become one of the flourishing and recognized cities. It was given a municipal administration status and governed by an appointed mayor. During the Derg regime Adama became center for Eastern Shoa Administration Region and it was also a Yerer and Kereyu Province capital and center to the administration. Today, Adama is also the seat of Eastern Shoa Zone with a status of first grade (principal city) urban local administration city. It has urban governance legally recognized by the Oromiya Regional State Council Proclamation No. 195/2015, having a status of self-urban administration.

The study of urban governance and management is initiated by the Oromia Urban Planning Institute (structural plan preparation team) and City Administration of Adama. It is one of the components for the structural plan preparation of Adama City. Figure 3.1 shows the location of the city within the country and the sub-cities within the city.



(a)



(b)

**Figure 3-1:** Location of (a) Adama city in Ethiopia and (b) sub-cities in Adama municipality  
(Source: (a) Abduro & Sreenivasu (2020) and (b) the revised restructure presented in the city magazine)

### 3.2 Study Design

This study was conducted with the aim of assessing the design approval and project follow-up processes of building projects in selected sub-cities (SCs) of Adama. Given the nature of this research goal, a descriptive study, uncovering the "what, where, and how" of a phenomenon, design has been deemed appropriate. By adopting a descriptive study design, the research seeks to address fundamental questions about the ongoing practices, procedures, and conditions associated with design approval and project follow-up in the selected sub-city. This approach is vital for understanding the current status of the subject matter, fulfilling the research objectives, and elucidating the role and purpose of the study in contributing to the body of knowledge in this domain.

### **3.3 Target Population and Sampling**

The target population for this study includes professionals from two key entities involved in the design approval and project follow-up processes: construction permit and project follow-up directorate Professionals. This group comprises professionals working within the City's Building Permit and Control Authority and they are specifically engaged in the roles related to construction permit issuance and project follow-up.

Construction Permit and Project Follow-Up Team Professionals in Sub-Cities: the second target population encompasses professionals from the Building Permit and Control Offices in the various sub-cities. These individuals are part of the construction permit and project follow-up teams responsible for overseeing building projects within their respective sub-city jurisdictions. The insights gathered from these two target populations will provide a comprehensive understanding of the design approval and project follow-up processes at both the central and sub-city levels, contributing to the overall objectives of the study.

The sampling strategy for this study was purposive sampling, specifically focusing on two selected sub-cities within Adama City. The choice of these sub-cities was intentional and guided by the principle of purposive sampling, which allows for a deliberate selection based on specific criteria. This purposive sampling approach aimed to capture diversity within the sub-city categories, providing a nuanced understanding of design approval and project follow-up processes in different contexts. The selected sub-cities were supposed to serve as representative cases for the broader assessment conducted in the study. To ensure a representative sample from the total of six sub-cities in the City Administration, two sub-cities were purposefully selected from each of the "Inner" and "smart Adama city" sub-city categories, which are Lugo and Aba Geda (Smart Adama City) sub-cities.

### **3.4 Data Collection Techniques**

Mixed methods of data collection techniques, that is primary data coupled with secondary data sources, were employed for undertaking the research work. The data collection instruments, including document reviews, interviews, and questionnaires, were strategically chosen to ensure a comprehensive and multi-faceted exploration of the design approval and project follow-up processes in the selected sub-cities of Adama.

For primary data, the researcher collected first hand data from professionals working in the sub-cities using closed and open-ended questionnaires. Thus, two separate questionnaires were prepared for gathering data from the corresponding professionals. These are questionnaire for professionals in design approval department within sub-city and questionnaire for professionals in project follow-up department within sub-city. The questionnaires prepared for both the departments of design approval and project follow up within sub city were designed to address the research objectives of examining the current practice of design approval and project follow up process, identifying the challenges encountered by design approval and project follow up officials in effectively and efficiently implementing its mandates.

Likert scaling was used for ranking questions that have an agreement level. The respondents were asked to give their perceptions in-group of questions on five-point scale (very high to very low), which reflected their assessment regarding the challenges that faced design approval and project follow up team.

The questionnaire to professionals in design approval was designed to gather insights from professionals involved in the design approval process. Questions was designed to delve into their experiences, challenges, and perspectives on the current state of construction permits. The second questionnaire was specifically designed for professionals engaged in project follow-up. It aimed to collect data on their experiences, challenges, and observations related to the project follow-up process. Separate interview sessions were conducted with the heads of both the design approval and project follow-up directorates/teams. The interview questions were thoughtfully designed to directly address the research objectives, focusing on understanding and assessing the current practices associated with construction permits and project follow-up.

Secondary data was collected from the Ethiopian Building Proclamation, Regulation, and Directive using document review as data collection instrument. The Building Proclamation, Regulation and Directive that are currently in use were viewed in detail by the researcher in order to dictate the provisions within the legislation with regard to construction permit and project follow up and inspection. Moreover, the documents were assessed for contents related to design approval, project follow-up, and regulatory frameworks. The content for compliance, efficiency, and areas of improvement were also evaluated.

Moreover, to evaluate the quality and completeness of cadastral records related to construction projects, cadastral record review and online platforms and databases were checked. Cadastral records, including project plans, land ownership details, and approval documentation were assessed for the accuracy and accessibility of cadastral information. Extract quantitative data targeted on project timelines, approval durations, and deviations. The online platforms or databases store project-related information and timelines and the relevant data points were extracted for analysis.

### **3.5 Validity, Reliability and Ethical Consideration**

Validity is the degree to which a test measures what implications to measure and the validity of the questionnaire data depends in a crucial way on the ability and willingness of the respondents to provide the information requested. The questionnaire was prepared based on the relevant information obtained from literatures and similar study instruments; it was made suitable for the existing research environment. Furthermore, the questionnaires adapted were pilot tested by the thesis advisor, professionals from the area and experts to be validated. On the other hand, as some of the statements of the questionnaires were arranged for rating on a 5-point Liker scale, internal consistency reliability was tested by Cronbach's alpha coefficient.

All the research participants included in this study were appropriately informed about the purpose of the research and their willingness and consent was secured before the commencement of distributing the survey questionnaire and asking them to give their responses to the interview questions. Moreover, the author took care of intentionally not misreporting the findings which would be disadvantageous to the participants

### **3.6 Pilot study**

The piloting was done in Lugo sub-city construction permit office workers design approval and project follow up teams to test whether the questionnaire was intelligible, unambiguous and easy for respondent to understand and respond. Pilot study of the questionnaire was conducted by investigating sample questionnaires. 15 questionnaires were distributed to engineers such as projects managers, site engineers, office engineers and organization managers who have a strong practical experience in the industry. Their sufficient experiences were a suitable indication for pilot study. Based on the pilot study, the following issues were fixed on the questionnaires.

- Some factors and sentences were modified or represented with more details.
- Factors which were repeated more than once with the same meaning were eliminated.
- Some factors and sentences were modified in order to give clear meaning and understanding.
- Some local factors were added as recommended by local experts who believed them to affect the performance of public building construction projects.
- Some factors were rearranged in order to give more suitable and consistent meaning
- There were some questions which were not practical or realistic with respect to local situations of building construction projects. Such questions were removed or modified to be realistic and fit to practical situations.

Based on the comments obtained from the pilot study, the questionnaire was modified and corrected and as a result the final questionnaire have been made more clearer by replacing ambiguous words with simple and understandable ones.

### **3.7 Data Analysis Methods**

In the study, both quantitative and qualitative methods of data analysis were used as the research primarily relied on mixed methods approach. To this end, quantitative data obtained from survey questionnaire was analyzed using Relative Importance Index (RII), percentage and ranks. Whereas qualitative data obtained from interview and document review were analyzed qualitatively.

The collected raw data was first sorted, edited, coded and then entered into computer software. Two programs were used, the Excel Microsoft and SPSS software. Suitable graphical representations and tables were used to present and analyze the questions. The basic scale was used in the analysis methods. The ordinal scale is a rating data, which uses integers in ascending or descending order. The RII method has been widely used in construction management research for determining and formulating attitudes with respect to surveyed variables, and so was in this research. The relative importance index was computed using the following equation:

$$\mathbf{RII} = \frac{\sum W}{AN} = \frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + 1n_1}{5N}$$

Where

- $W$  is the weighting given to each factor by the respondent, ranging from 1 to 5,
- $n_1$  is number of respondents for strongly disagree,
- $n_2$  is number of respondents for disagree,
- $n_3$  is number of respondents for somewhat neutral,
- $n_4$  is number of respondents for agree,
- $n_5$  is number of respondents for strongly agree).
- $A$  is the highest weight (i.e. 5 in the study) and
- $N$  is the total number of samples.

The relative importance index ranges from 0 to 1 (Boakye et al., 2023).

## CHAPTER 4: RESULTS AND DISCUSSION

The results from the document review (on the Ethiopian building legislation), interview and questionnaire survey are presented, interpreted and analyzed in detail in this part. The chapter illustrates and discusses the gaps identified in reviewed building legislation, design approval and project follow up current practice, the challenges of design approval and project follow up officials while undertaking their responsibility and the impacts followed due to the challenges identified earlier.

### 4.1 Questionnaire Response Rate

Equal questionnaires were distributed to design approval officials and project follow up officials. Out of 70 questionnaires distributed to design approval officials, 66 (94.29%) were returned. Whereas out of the 70 questionnaires distributed to project follow up officials, 65 (92.86%) were returned.

Two questionnaires from design approval team officials were rejected for the case of incompleteness; hence, out of the 66 questionnaires filled by project follow up officials 64 were found to be suitable for data analysis and 65 questionnaires filled by project follow up officials 60 were found to be complete. The details of respondent responses and the rate are summarized in the table below.

**Table 4-1:** Questionnaire response rate

Respondents Category	Questionnaires			Valid response	
	Distributed	Returned	%	Number	%
Design approval team	70	66	94.29	64	96.97
Project follow up team	70	65	92.86	60	92.31
Total	140	131	93.57	124	94.66

## 4.2 Background Information of the Respondents

### 4.2.1 Gender of respondents

Table 4-2 shows that more than 60% of the respondents, in both design approval team and project follow up categories were male. So, in the city public construction, female participation needs to improve in both project design and follow up positions.

**Table 4-2:** Gender of respondents

Gender	Design approval team		Project follow up team	
	Frequency	%	Frequency	%
Male	40	62.5	39	65
Female	24	37.5	21	35
Total	64	100	60	100

### 4.2.2 Respondents work background

Table 4-3 shows design approval and project follow up respondents' previous work background (*immediately before joining sub city*).

**Table 4-3:** Respondents previous work background

Position you were working at before joining sub-city	Design approval team		Project follow up team	
	Frequency	Percentage	Frequency	Percentage
Design preparation in consulting firm	20	31.25	20	33.33
Site supervision in consulting firm	18	28.13	18	30.00
Office engineer in contractor firm	10	15.63	10	16.67
Site engineer in contractor firm	16	25.00	12	20.00
Total	64	100.00	60	100.00

### 4.2.3 Respondents work experience in the current position

Table 4-4 shows design approval and Project follow up respondents work experience in their current position.

**Table 4-4: Respondents work experience**

In which specific area do you work now?	Design approval team		Project follow up team	
	Frequency	Percentage	Frequency	Percentage
Architectural	16	25.00	13	21.67
Structural	14	21.88	25	41.67
Electrical	15	23.44	12	20.00
Sanitary	15	23.44	10	16.67
Survey	2	3.13	0	0.00
Other	2	3.13	0	0.00
Total	64	100.00	60	100.00

#### 4.2.4 Respondent's Experience in the Company

Table 4-5 shows that on average from design approval and project follow up team more than half (>56%) have limited experience of "Less than 5 years" in the company.

**Table 4-5: Number of years of work in the company**

Years of experience in construction work	Design approval team		Project follow up team	
	Frequency	Percentage	Frequency	Percentage
1 - 5	36	56.25	34	56.67
6 - 10	14	21.88	10	16.67
11 - 15	10	15.63	11	18.33
16 - 20	4	6.25	5	8.33
Total	64	100.00	60	100.00

#### 4.2.5 Academic qualification of the Respondents

As depicted in Table 4.6, more than 75% of the respondents, in both category of study, hold at least B.Sc. degree. This information likely to positively contribute to the quality of relevant information gathered from the respondents, as they are fittingly qualified and experienced.

**Table 4-6:** Degree of the respondents

Educational qualification	Design approval team		Project follow up team	
	Frequency	Percentage	Frequency	Percentage
PhD	-	-	-	-
Master's degree	10	15.63	8	13.33
B.Sc. degree	41	64.06	38	63.33
Diploma	11	17.19	10	16.67
Other	2	3.13	4	6.67
Total	64	100.00	60	100.00

### **4.3 Gaps identified based on reviewing the Building Legislation**

After carrying out a review of the Ethiopian Building Proclamation, Regulation and Directive, the following gaps were identified by the researcher.

The Building Proclamation contradicts with the Building Directive with regard to the number of copies of the building designs submitted for review. According to Art. 6(5) of the Building Proclamation the number of copies of the building design submitted for review are two and upon approval one set of the approved document shall be returned to the applicant and the other set shall be retained by the urban administration or designated organ. In contrast to this Art. 5.1 of the Building Directive states that the number of copies of the building design submitted for review are three and upon approval two sets of the approved document, signed and stamped “APPROVED” on the first copy and “FOR INSPECTION ONLY” on the second copy, shall be returned to the applicant and the third copy shall be stamped "REMAINDER" and retained with the applicants file by the urban administration or designated organ.

According to Art. 32(5) of the Building Proclamation “No owner shall commence construction unless approved sanitary facilities are availed for all personnel employed, at the site or, with the permission of the urban administration or designated organ, at some other place. The construction activity shall be interrupted till such facilities are provided”. But when we look the prerequisites for having construction commencing permit listed from Art. 14.1.1 Up to 14.1.8 of the Building Directive, such requirement related to sanitary facility is not mentioned at all.

According to the Building Regulation Art. 6(4) and the Building Directive Art. 4.3, the building officer may request the urban administration or the designated organ additional time to review

huge or complex projects. But it does not indicate in detail the criteria for identifying the project to be huge or complex. The reason for requesting additional review time is subjective and may be misused because the criteria is not clearly connected to the project’s height, or area, or cost, or method of construction or some other objective reasons.

Unlike design review where a group of professionals are engaged the building legislation assign a single building inspector, a civil engineering professional by default, for undertaking the control of site executions even beyond his/her specializations like electrical and sanitary work items. This shows the building legislation concern given for the inspection of such items of work is not as it shall be

#### 4.4 Challenges encountered by design approval and project follow up officials

Understanding the existing challenges is an absolute necessity for resolving them effectively. The design review officials are encountering many challenges during accomplishing their responsibilities; those challenges hamper achieving their objectives. This section aimed to determine the most frequent challenges the officials encountered during design reviews.

The officials were provided with a list of challenges that were grouped into three categories based on their source; these are external environment, legislation and internal environment. They were required to express their view for the degree of the listed challenges on a Likert scale basis. Based on the respondents rating, the RII values for each item in the challenge list were calculated, ranked and presented (Table 4-7).

**Table 4-7:** Challenges encountered by design review officials

No.	Challenges in design review	RII	Rank With in the Category	Overall Rank
<b>Challenges coming from designers and clients</b>				
1	Incomplete drawings	0.82	2	2
2	Error in drawings	0.75	7	9
3	Un standardized symbols and terminology in drawings	0.53	8	26
4	Designs prepared by unregistered professionals	0.53	8	26
5	Application forms are not professionally prepared and uncoordinated.	0.79	4	4

No.	Challenges in design review	RII	Rank With in the Category	Overall Rank
6	Lack of project designers' knowledge and skills (especially legal aspect)	0.83	1	1
7	Designers design projects without site experience	0.78	5	6
8	Client's limitless requirement changes	0.80	3	3
9	Clients rushing designers for quick the design permission	0.76	6	8
<b>Challenges coming from legislation</b>				
1	Insufficient time allotted for design review	0.59	9	23
2	Complicated verification procedures	0.63	7	20
3	Long-lasting procedures due to side participants' (like from different utility authorities)	0.66	5	17
4	Inadequate legislation supporting design review	0.74	2	11
5	Mutually uncoordinated and complicated legislation	0.64	6	19
6	Out dated laws & standards that do not allow modern constructions	0.60	8	22
7	No provision of trainings & making clarity about newly enacted or amended legislations for the stakeholders	0.79	1	5
8	Regulations requiring unreasonable requirements for the clients	0.73	4	14
9	Frequent changing of rules and regulations	0.74	3	12
<b>Challenges coming from internal environment</b>				
1	Inadequate number of staffs	0.77	1	7
2	Lack of working facilities	0.68	5	16
3	Lack of officials' technical knowledge and skills	0.66	6	17
4	Inefficient staff	0.58	8	24
5	Responsibility of staffs not clearly identified	0.58	8	24
6	Lack of good communication among staff	0.74	2	10
7	Poor documenting system.	0.74	3	12
8	Lack of co-ordination with land administration office	0.61	7	21

Based on the RII values, the top ten challenges the design review officials are being encountered are:

1. Lack of project designers' knowledge (especially legal aspect)
2. Incomplete drawings
3. Investors limitless requirement change
4. Applications are not professionally prepared and uncoordinated with standards
5. No provision of trainings & making clarity about newly enacted or amended legislations
6. Designers without site experience
7. Inadequate number of staffs
8. Investors rushing designers for quick development of the structure
9. Error in drawings
10. Lack of good communication among staff

Among the top ten challenges that design review officials are being encountered, seven of them (rank no. 1, 2, 3, 4, 6, 8 and 9) in the above list emanate from the external environment (investors and designers). Among the challenges that emanates from legislation, only one item (rank no. 5) in the above list is included with in the top ten. Two of the challenges (rank no. 7 and 10) in the list above belong to the internal environment (design review office/authority). Detailed discussion of the top ten challenges are presented under here with respect to the findings with the current practice and the agreement with those of the findings by other researchers from the literature review.

#### 4.4.1 Challenges coming from the external environment

As observed in the above list, 70% among the top ten challenges are sourced from the external environment (designers and investors). Rank no. (1) Lack of project designers' knowledge (especially legal aspect), (2) Incomplete drawings, (4) Applications are not professionally prepared and uncoordinated with standards, (6) Designers without site experience and (9) Error in drawings could be grouped under the designers mandate as not only the design but also the design approval application process is usually undertaken by the designer itself. Whereas rank no. (3) Investors limitless requirement change and (8) Investors rushing designers for quick development of the structure could be categorized under the investors mandate.

In an earlier section, while assessing the current practice of the design approval process, it was discovered that designs could never be approved in its first application. The disqualification of the design from being approved could either be due to the problem in the application process or due to the deficiency in the design itself. Rank no. (4) Applications are not professionally prepared and uncoordinated with standards could be a great indicator for deficiencies in the application process. Weak applications can pose obstacles to the design approval process and this was also indicated by earlier researchers. Hammah (2015) indicated that substandard applications makes assessment difficult and waste the time of both the applicant and the assessor. Incomplete applications can cause challenges in building permit issuance (Jovanovice et al. 2016).

The deficiencies in drawings that are being a challenge for design reviewing officials can be expressed in two general terms as lack of legal knowledge and lack of technical knowledge by the designer. The first rank among the top ten challenge list is occupied by lack of project designers' knowledge with respect to the legal aspect. The respondents view for the current practice of the design approval process is also in same manner to this where 81% of them said applicants for design approval could Never/Sometimes approach officials for discussing on legal requirements. This finding is in agreement with the findings of (Jovanovice et al., 2016) who, while comparing the building permit procedure in Slovenia and Croatia, figured out the lack of designers' legal knowledge as a main shortcoming in building permit issuance.

The three entries among the top ten challenges list; rank no. (2) Incomplete drawings, (6) Designers without site experience and (9) Error in drawings can be treated as lack of technical knowledge by the designer. The second segment of obstacles that emanates from the external environment is from investors. Among the top ten challenges rank no. (3) Investors limitless requirement change and (8) Investors rushing designers for quick development of the structure are a good example for this.

It can be understood that investors rushing designers during the design preparation and approval process, may force designers to forget some requirements of the investor himself/herself. Which later brings requirement changes by the investor once after construction has been started. If adequate time is not allocated and study of the investors' requirement is not undertaken by the

designer during the planning stage, requirements changes could be inevitable during the construction stage which poses obstacle for the design approval process.

#### 4.4.2 Challenges coming from the internal environment

From among the sources that contribute for the top ten challenge list of the design review officials, the problem within the design review office/authority offers two items. These are rank no. (7) Inadequate number of staff and (10) Lack of good communication among staff.

While investigating design review current practice, one third of the respondents proclaimed that they have under staff and this could be a good indicator that respondents identified the challenge ‘Inadequate number of staff’ to be one of the ten main obstacles that could hinder design review officials from properly undertaking their responsibilities. Agyeman et al. (2016), who conducted an extensive research on the challenges in the processing of building permits in Ghana, also identified that ‘Inadequate number of staff’ was the most crucial challenge that the permit acquisition process faced in Ghana.

Nearly half of the respondents for the design review current practice believed that they either ‘Never’ or only ‘Occasionally’ share lessons learned among staff members. This disclosure is in agreement with the respondent’s identification of ‘Lack of good communication among staff’ as one of the top ten’s among the design review challenges. Design of a single building project is reviewed by different officials based on their respective disciplines. The Architectural, Structural, Electrical and Sanitary drawings of a single building project’s design review is undertaken by the corresponding separate departments.

And the lack of good communication among these departments with regard to the applicant’s single building project creates fragmentation and poses an obstacle for them for effective and efficient design review as well as approval.

#### 4.4.3 Challenges emanating from legislation

The problem with regard to legislation is rooted from accustoming officials with the current legislations that are in force. This is revealed when ‘No provision of trainings and making clarity about newly enacted or amended legislations’ is included within the top ten design review challenge list. Jovanovice et al. (2016) also identified that incapability of officials in

interpretation of legislative acts can increase the possibility of errors and emerges as one of the main obstacles in building permit issuance.

#### 4.5 Challenges encountered by building inspectors

Understanding the existing challenges is an absolute necessity for resolving them effectively. Many challenges may encounter the site inspecting officials in accomplishing their responsibilities and these possible hamper achieving their objectives. This section aims to determine challenges which the officials most frequently experience during site inspection.

Again, the officials were provided with a list of challenges that are grouped into three categories based on their source; namely, external environment, legislation and internal environment and required to express their view on the degree of the listed challenges on a Likert scale basis. Based on the respondents rating, the RII values for each items in the challenge list were calculated, ranked and presented in the Table 4.8.

**Table 4-8:** Challenges encountered by building inspectors

No	Challenges in project follow up	RII	Rank in Class	Overall Rank
<b>Challenges coming from designers and clients</b>				
1	Projects not being executed by registered professionals	0.65	10	17
2	Projects are executed by referring to commonly known practices in the past rather than approved standards	0.75	4	6
3	starting of the project without design approval	0.45	14	33
4	Proceeding the work before design changes are approved	0.78	1	2
5	Contractors and consultants assign inadequate no of professionals in the site	0.66	8	15
6	Contractors and consultants assign professionals with no specializations (like for sanitary & electrical installation)	0.76	2	4
7	Experience of using site book	0.61	12	23
8	Not informing the permit and control office when the project needs approval before passing to next stages	0.72	6	9
9	Continuous change of professionals in the site	0.65	10	17
10	Lack of contractors and consultant's knowledge (especially legal aspect)	0.75	5	7
11	Professional participating in construction lack site experience	0.66	8	15

No	Challenges in project follow up	RII	Rank in Class	Overall Rank
12	Starting of the project work without available of materials	0.61	12	23
13	clients limitless requirement change	0.76	3	5
14	Clients need for quick development of the project	0.72	6	9
<b>Challenges coming from legislation</b>				
1	Authority given for inspectors is limited	0.67	2	13
2	Executing of the project with approved design	0.67	2	13
3	Time allotted for site visiting from the date of request by the applicant is insufficient	0.61	4	23
4	Complicated inspection procedures	0.54	9	32
5	Inadequate legislation supporting for project follow up	0.59	6	27
6	Mutually uncoordinated and complicated legislation	0.57	7	28
7	Out dated laws & standards that do not allow modern constructions	0.57	7	28
8	No provision of trainings & making clarity about newly enacted or amended legislations	0.68	1	12
9	Regulations requiring unreasonable requirements	0.61	4	23
<b>Challenges coming from internal environment</b>				
1	Lack of transportation facility for regular inspection	0.79	1	1
2	Inadequate number of staffs	0.77	2	3
3	Inefficient staff	0.56	9	30
4	Inability of inspectors to cope up with the fast-growing technology	0.64	5	19
5	Lack of inspector's technical knowledge and skill	0.63	6	20
6	Contradicting designs approved by the design review team	0.63	6	20
7	Limited Participation of field personnel in the design review stage	0.63	6	20
8	No mechanism for documenting the lessons learned	0.71	4	11
9	Documenting system	0.55	10	31
10	Salary for inspectors is much lower than their effort	0.73	3	8

Based on the RII values, the top ten challenges that building inspectors are being encountered are:

1. Lack of transportation facility
2. Proceeding the work before design changes are approved
3. Inadequate number of staffs for field inspection
4. Contractors assign professionals with no specializations (like for sanitary & electrical installation)
5. Investors limitless requirement change
6. Projects are executed by referring to commonly known practices in the past rather than approved standards
7. Lack of contractor's knowledge (especially legal aspect)
8. No provision of trainings & making clarity about newly enacted or amended legislations
9. Not informing the office during the times where the project needs approval before passing to next stages
10. Investors rushing for quick development of the structure

By correlating the items within the top ten lists of the design review challenge to those of the project follow up challenge, five of them are similar regardless of their ranks. Among the top ten project follow up challenge list the differing items from the design review challenge list are: rank no. (1) lack of transportation facility, (2) proceeding the work before design changes are approved, (4) contractors assign professionals with no specializations (like for sanitary and electrical installations), (6) projects are executed by referring to commonly known practices in the past rather than approved standards and (9) not informing the office during the times where the project needs approval before passing to next stage. These five distinct challenges will be discussed under here.

The lack of transportation facility is the first ranked obstacle that building inspection officials are being encountered. The nature of the building inspection work is completely different from the nature of design review work. In case of design review designs are submitted to Sub-city where the design review officials are located. Whereas during building inspection work it is must for the building inspector to go personally to the construction site in order for undertaking the project follow up work task. This requires the building inspector to tour daily from one

construction site to another hence transportation facility is back bone for the project follow up work.

The lack of transportation facility would make the project follow up work task to be troublesome, extend the duration of inspectors for reaching to construction sites and may also create shortage of building inspector staff. Botchway et al. (2014) also discovered that the lack of transportation facility is the main challenge for inspectors since building inspectors are expected to inspect and visit within the month as many buildings as possible.

Two of the top ten projects follow up challenges; rank no. (2) Proceeding the work before design changes are approved and (9) Not informing the office during the times where the project needs approval before passing to next stages are against the Ethiopian building legislations. Art. 9(1) of the Ethiopian Building Regulation No. 243/2011 states that where need arises to modify the original plan during construction the modified plan shall be prepared and submitted to the building officer for approval prior to implementation.

Furthermore Art. 22.1 of the Adama City Administration Building Directive No. 2/2018 declares that anyone who carry out an expansion work without permit shall be penalized from 2000 up to 5000 ETB based on the building category. On the other hand Art. 15(1) of the Ethiopian Building Proclamation No. 624/2009 a person who has an approved plan for construction of category “B” and “C” building shall give notice to the building officer the starting date of each stage of work. Moreover Art. 22.1 of the Adama City Administration Building Directive No. 2/2018 states that anyone who starts construction without notification shall be penalized from 2000 up to 4000 ETB based on the building category.

The two projects follow up challenges discussed above holds a meaning beyond being an obstacle for building inspectors but could also serve as an alarm to act by the respective organ. If contractors are proceeding their work without notifying the building officer for approving the work stage is performed in accordance with the approved design, there could be no way that public safety could be protected. And again, if modification of the approved plan is being exercised without the consent of the building officer, the review and approval of the original plan could be useless. Because one can have a perfect approved plan on hand and builds whatever he/she wants regardless of the interdiction that the original plan imposes. For this

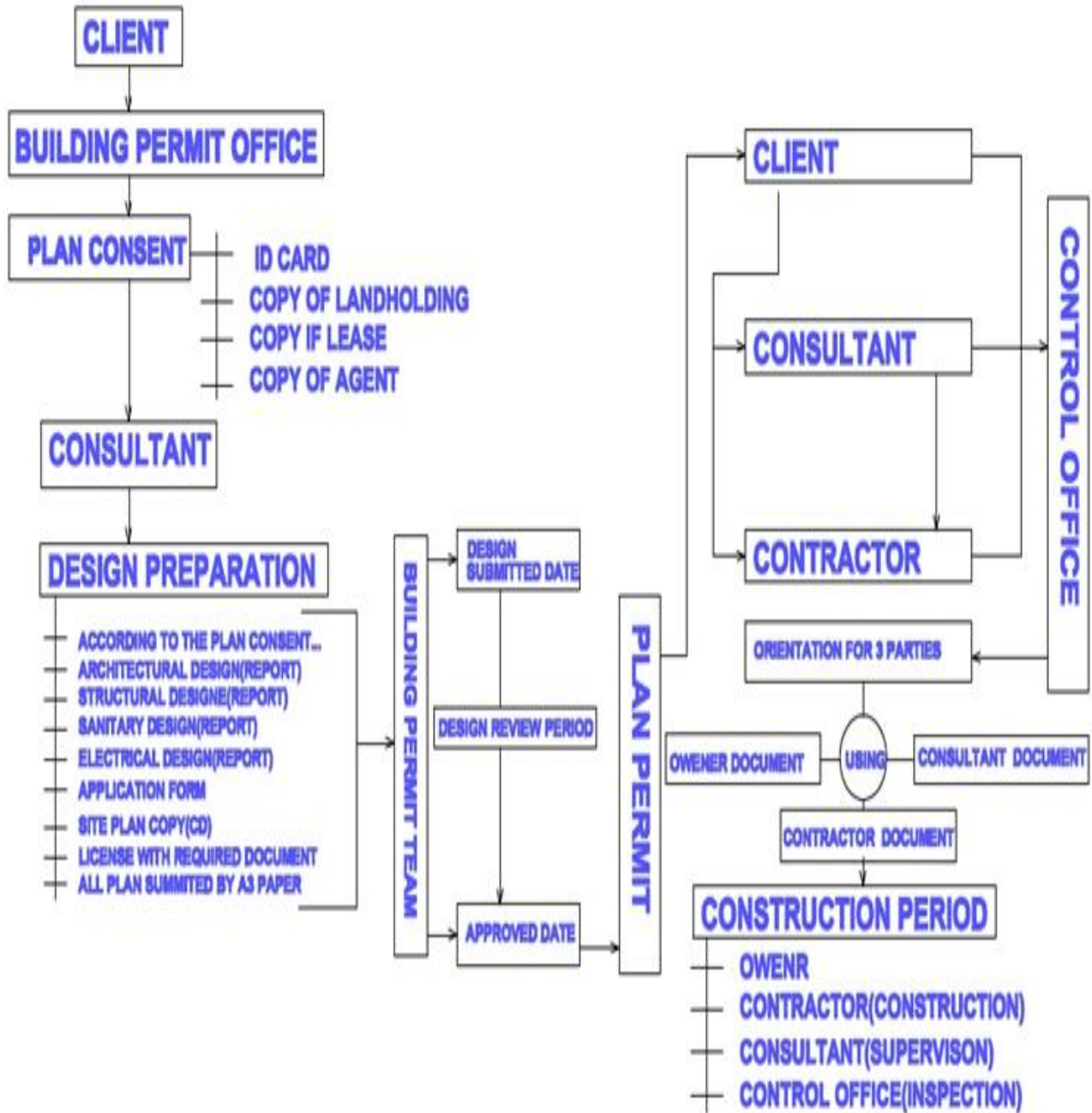
reason, serious works has to be performed for not only removing these obstacles for building inspectors but also for avoiding the dangers that could be followed due to these irresponsible acts of constructing entities.

Among the top ten challenges another two items which are endemic to project follow up and not included in top ten lists of design review challenges are; rank no. (4) Contractors assigning professionals with no specialization (like for sanitary and electrical installation) and (6) projects are executed by referring to commonly known practices in the past rather than approved standards. With regard to the first challenge it is a common practice that only a civil engineer is assigned by the contractor for controlling the carrying out of Structural, Electrical, Sanitary, Architectural and Temporary/False works. The absence of respective professionals/engineers for Electrical and Sanitary works gives rise to below standard works.

In case of the second challenge if we take for example the concrete mixing ratio, it has to be computed specifically for the building project based on the property and quality of the available ingredients of the concrete. Therefore, for such items of work the scientific and standard methods shall be followed instead of the conventional ones.

#### **4.6 Construction Permit and Project Follow Up Process**

In the above section the researcher tried to reveal the pre-requisites to be fulfilled, the course of actions to be taken and the out puts for the major components of the construction permit and project follow up process. In this section construction permit and project follow up flow chart, comprised of the major component discussed in the above section, are presented. The flow chart (Figure 4.1) was developed by the researcher based on the information gathered through interview with team leaders of both design approval and project follow up within the selected SCs and also based up on the review of the building legislation with regard to construction permit and project follow up. The diagram clearly dictates the steps to be followed in the design approval, construction permit and project follow up process throughout the project life cycle from infant stage of planning consent to the late stage of occupancy permit.



**Figure 4-1:** Construction permit and project follow up process flow chart

#### 4.7 Discussion based on the result of open-ended questions

In section three part of the questionnaire both the design approval and project follow up officers were asked to describe what they are experiencing in doing their works. The results of the responses will be summarized in answering the research questions and along with the archive data in the construction permit and follow up office working manuals.

#### 4.7.1 Design approval teams

*1. What are the requirements that need to be fulfilled so that application for design approval is accepted? (Like required documents, drawings and no. of copies)*

Almost all respondents' responses to this question, there are user manuals building directive no.2/2018 to check the customers fulfilling the design requirements and they added these types of service are similar thought the city. for designs prepared by consultants Completed form of "consultant duty entering" signed by design professionals and sealed A copy of the consulting company's renewed trade license, registration and competence certificate and Tin no. to be referenced with the original document and have the company's seal A copy of landholding certificate Plan consent BOQ A copy of the design professional's renewed professional license and Tin no. referenced with the original document Professional indemnity as per the design Correct information about the neighbor Design as per the building category (Architectural, Electrical, Sanitary, Structural, Analysis, Report and Soil investigation report are required for category "B" building. For category "C" buildings: In addition to designs required for category "B" buildings Fire accident prevention design and Electromechanical designs (if any) are required). Design review fee as per the project estimate. Back to the applicant sealed with "REJECTED" The comments and provision of the law violated expressed in detail.

*2. What are the major procedures followed for approving a design?*

The builder officer, after fulfilling the above requirements, shall investigate the compliance of the design and documents with urban plan and Ethiopian building process standards based on the time assigned for each category of building, then the approval process design complying with building legislation two sets of documents sealed with approved and for inspection only returned to the applicant and the third set sealed with remainder retained with the applicant file at the sub city issued for the owner himself or his appointee, rejection building that don't comply with building legislation Returned

*3. How much time is allocated for review and return of comments on design? And does the duration vary based on the type of the project?*

The standard time allocated according to the building directive no.2/2018 page 12 and the respondents response for the design review was depends on the building categories other than real estate building "Category 'A' Building five days, for "Category 'B' seven days and

Building”, “Category ‘C’ Building” and category B real estate 21 days . duration vary based on the type of the project and complexity the one can ask additional time by filling the intended from number 24 With regard to duration of the time allotted for design review, almost all the respondents testified that the duration is ‘Enough’.

4. *What are the key issues that a design review process checks? Are there uses any check list?*

The sample respondents described they used Check list for design approval process for architectural, structural, sanitary and electrical design approval. Based on this standard checklist they give comments to the consultants in the first, second and third rounds. Each checklist has of detail criteria fulfilled by the consultants for example architectural design checklist occupies Master Plan and LDP, Elevations, Section and Sectional, Elevation Roof plan Floor Plans Fire Escape /According to the Ethiopian Building Standards Building Setbacks Parking and Green Area /For every 100m<sup>2</sup> of the plot 2m\*2m covered one tree. The checklist for each types of plan is show in the appendix part of the research.

5. *What are the advantages of using check list in the design approval process?*

Checklist is useful to uniform service delivery for customers’ checklists are useful for document preparation ahead. Checklist consists of key issues that a design review process checks they are uniform throughout the sub cities. The figure below shows construction permit process.

#### 4.7.2 Project follow up teams

1. *What are the major procedures followed during construction project follow up?*

Major procedures followed during construction project follow up according the respondents and the document copy of construction permit certificate, a copy of landholding certificate , Demolition permit (if there is a structure to be demolished) ,Completed owner duty entering form Contractor, matching for the work level, shall fulfill Contract agreement in line with the country's construction contract (GCC and SCC) Renewed trade license, registration, Tin no., VAT registration and competence certificate referenced with the original) A copy of professional license and Tin no. of the site engineer hired by the contractor and matching the project Contractor all Risk matching the project Completed contractor duty entering form Consultant matching for the work level, shall fulfill Contract agreement in line with the country's

construction contract (GCC and SCC) Renewed trade license, trade registration, Tin no., VAT registration and competence certificate to be referenced with the original) A copy of professional license and Tin no. of the site engineer hired by the consultant and matching the project BoQ for public building.

*2. What are the major phases where construction site inspections are mandatory?*

Notification of the starting date of each stage of work before five working days of such date to the building officer with “construction activity stage notice” form, Fee: ETB 400 and ETB 800 for Category “B” and “C” buildings respectively for each inspection stages, The building officer shall ensure that the construction of such stage is in compliance with the permit Time: within 5 working days from the receipt of the notice The building inspector issues: “construction stoppage warning” stating the breaches if the construction activity doesn’t conforms to building legislations Major phases where construction site inspections are setting out, foundation work, rebar for footing, grade beam, all columns, slab beam and roof work. The project activities must inspect and supervise by the office engineers and approval papers have to give the customer says escape to the next stage of the project after checking all documents. Documents that used to check the conformity of construction site activities architecture drawings structural drawing, electrical and sanitary drawing. Detail drawing bill of quantities, technical specification and methodologies. What mechanisms do you use to improve the capacity of your project follow up staff members? ( Like short term trainings, short courses, regular education) almost all respondents said that in the construction permit and project follow up office no any special trainings given except short training.

*3. What are the major stakeholder activities in the site and its role?*

Respondents mentioned the main stakeholders in site or projects are Client, contractors, consultant and regulatory bodies’ .respondents also wrote the roles of each party in the site clients financing and controlling the project, contractors are responsible erecting the building according to the approved design and consultants design and supervise the contractors work regularly in the site but in practical, the faced many challenges. Some of these are poor communication between contractors to consultants, poor work man ship by the contractors,

delay payments by the client to the contactors lack of frequent inspection by the regulator bodies delay project delivery time, disputes between parties interrupting the project phase, design problems. The respondents stress that the main critical problems were constructing the project without the available of assigned site supervisor and site engineers by the contractors' side on the site commonly by Forman. The sub cities regulator body or construction permit and design approval had no option other than penalized them depends on the building categories.

## **CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Conclusion**

The provisions within the building legislation concerning to design approval and project follow up are clearly stated, correspondence to one another, mutually coordinated and adequate. This fact is further strengthened by the view of design approval and project follow up officials for building legislation that are currently in-force; where the clarity of legal provisions with regard to design approval and project follow up is assessed to be high or satisfactory by 88% and 92% of design review and project follow up officials respectively.

The concern given by the building legislation by the contractors who aren't obey the rules such as building without the approval of inspection team and without the presents of site supervisor and site engineer needs attention. Even if the reasons for the acceptance of the request for the extension of expired validity of a construction permit are clearly indicated, the measures that could be taken are not explain if the reason for the expiry of the validity period is outside the listed ones.

The degree of deficiencies occurring in designs is determined to be 'Excessive' by 42% of the respondents and 78% assessed that designs would 'Never' be approved in its first round application. But as a console for these two shocking facts, it was discovered that only small number of the design review officials assessed the response of design preparing entities for design comments to be 'Disobedient' and the design review officials are found to be tight enough to approve designs until all of the comments are rectified.

The design review process is open for applicants in order to be advised on given comments; furthermore, the process allows applicants for describing their views concerning the comments given on designs. But applicants for construction permit are less willing for approaching and discussing officials on legal requirements.

Design approving officials tend to cease reviewing the submitted design in detail when certain deficiencies are found. Giving back the design for the applicant before all the deficiencies are commented leads to the discovery of prior unseen discrepancies in next reviews; which may be corrected earlier if they were identified and commented.

Designs of different disciplines for a single building project are reviewed by its respective professionals based on the reviewer's areas of expertise. And there is no clearly known mechanism that would centrally coordinate the process with the intention of assuring that all portions of the design have received adequate review and comments given are not contradicting to one another.

The nature of project follow up work, spending time for moving from one project site to another, made the building inspectors to be in speed and the number of professionals are evaluated to be under staff. The degree of illegal development of structures (structures without building permits) is 'So few'. But there are still actions that need to be taken in order to reduce deficiencies occurring in building project execution. As a source of discrepancies from among the four disciplines Architectural, Electrical, Sanitary and Structural are ranked 1st to 4th respectively.

The top five challenges that design review officials are being encountered are lack of project designers' knowledge (especially legal aspect), incomplete drawings, investors limitless requirement change, applications are not professionally prepared and uncoordinated with standards and no provision of trainings and making clarity about newly enacted or amended legislations. The top five challenges that building inspectors are being encountered are lack of transportation, proceeding the work before design changes are approved, inadequate number of staff for field inspection, contractors assign professionals with no specializations (like for sanitary & electrical installation) and investors limitless requirement change.

## **5.2 Recommendations**

The following recommendations are based on the conclusions arrived from the survey results. The recommendations are towards to legislative organs of the government who enact building legislation; officials working in sub cities design approval and project follow up office and for all respective organs.

1. The building legislation shall be made to encompass clear, detail and obligatory provisions for the following subjects.
  - Permit and follow up of temporary structures and methods of work

- The measures that could be taken for the extension of expired validity of a construction permit due to the reasons other than those listed in the building legislations
  - The types of building projects whose review period can be extended by the building officer
2. The building officer shall devise a method for regularly assessing the performance of design review and project follow up team members and shall adopt a system for improving their performance based on the performance measure output
  3. The number of design review and project follow up professionals within the inner sub cities and expansion sub cities shall take into consideration the work load within the respective areas
  4. Design approval and project follow up officials; moreover design preparing and constructing entities shall be made to be aware of the building legislation.
  5. Building inspectors shall be provided with adequate transportation facility for facilitating their work.

On the other hand, further study is recommended for assessing the same issue by alternating the targets from sub cities officials to that of project designing and supervision entities (consultants), constructing entities (contractors) and also owners (clients). The views of consultants, contractors and clients for the current design approval and project follow up process, the challenges they are being encountered for attaining construction permits and approving site executions and the consequences of these challenges on same has to be further studied. Additionally, Since this study concentrated on assessing design approval and project follow up process with special reference to Adama city, further studies could be done in other major cities in Ethiopia for comparison purposes and allow for generalization of the findings over the whole country, Ethiopia

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## APPENDIXES

### Part 1: Questionnaire for Design approval Team

#### Section I: General information: Please add (√) as appropriate

1. Gender
  - Male
  - Female
2. Position you were working before joining sub city design approval team
  - Design preparation in consulting firm
  - Office engineer in contractor firm
  - Site supervision in consulting firm
  - Site engineer in contractor firm
  - Other
3. In Sub city design review team, in which specific area do you work now?
  - Architectural
  - Sanitary
  - Structural
  - Surveyor
  - Electrical
  - Other
4. Years of experience in construction work
  - From 1 to less than 5 years
  - From 6 to less than 10 years
  - From 11 to less than 15 years
  - From 16 to 20 years
5. Qualification
  - PhD
  - Diploma
  - Master
  - Other
  - B.Sc.

#### Section II: challenges faced by design review officials of sub cities

*Below are lists of different categories of challenges that may hinder sub city design review officials from properly commissioning their roles of reviewing designs. Please choose your opinion on the degree of challenges for each one. Please tick the appropriate cell.*

No.	Challenges in design review	Degree of challenge				
		Very High	High	Medium	Less	Very less
	<b>Challenges coming from designers (consultants) and clients</b>					
<b>1</b>	Incomplete drawings					
<b>2</b>	Error in drawings					
<b>3</b>	Un standardized symbols and terminology in drawings					
<b>4</b>	Designs prepared by unregistered professionals					

No.	Challenges in design review	Degree of challenge				
		Very High	High	Medium	Less	Very less
5	Application forms are not professionally prepared and uncoordinated.					
6	Lack of project designers' knowledge and skills (especially legal aspect)					
7	Designers design projects without site experience					
8	client's limitless requirement changes					
9	Clients rushing designers for quick the design permission					
	<b>Challenges from legislation</b>					
1	Insufficient time allotted for design review					
2	Complicated verification procedures					
3	Long-lasting procedures due to side participants' (like from different utility authorities)					
4	Inadequate legislation supporting design review					
5	Mutually uncoordinated and complicated legislation					
6	Out dated laws & standards that do not allow modern constructions					
7	No provision of trainings & making clarity about newly enacted or amended legislations for the stakeholders					
8	Regulations requiring unreasonable requirements for the clients					
9	Frequent changing of rules and regulations					
	<b>Challenges from internal environment</b>					
1	Inadequate number of staffs					
2	Lack of working facilities					
3	Lack of officials' technical knowledge and skills					
4	Inefficient staff					
5	Responsibility of staffs not clearly identified					
6	Lack of good communication among staff					
7	Poor documenting system.					
8	Lack of co-ordination with land administration office					
9	Salary for officials is much lower than their effort.					

**Section III: Open Ended Questions**

6. What are the major procedures followed for approving a design?

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7. What are the advantages of using check list in the design approval process?

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8. What are the requirements that need to be fulfilled so that application for design approval is accepted? (Like required documents, drawings and no. of copies)

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9. How much time is allocated for review and return of comments on design? And does the duration vary based on the type of the project?

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10. What are the key issues that a design review process check? Are there uses any check list?

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## Part 2: Questionnaire for Project Follow Up Team

### Section I: General information: Please add (√) as appropriate

1. Gender
  - Male  Female
2. Position you were working before joining sub city Project Follow Up Team
  - Design preparation in consulting firm  Office engineer in contractor firm
  - Site supervision in consulting firm  Site engineer in contractor firm
  - other
3. In Sub city design review team, in which specific area do you work now?
  - Architectural  Sanitary
  - Structural  Surveyor
  - Electrical  Other
4. Years of experience in construction work (in years)
  - 1 to less than 5  6 to less than 10
  - 11 to less than 15  16 to 20
5. Qualification
  - PhD  Diploma
  - Master  Other
  - B.Sc.

### Section II: challenges faced by project inspectors of sub cities

*Below are lists of different categories of challenges that may hinder sub city building inspectors from properly accomplishing their roles of project follow up. Please choose your opinion on the degree of challenges for each one. Please tick the appropriate cell.*

No.	Challenges in project follow up	Degree of challenge				
		Very High	High	Medium	Less	Very less
	<b>Challenges coming from designers (consultants) and clients (external environment)</b>					
1	Projects not being executed by registered professionals					
2	Projects are executed by referring to commonly known practices in the past rather than approved standards					
3	starting of the project without design approval					

No.	Challenges in project follow up	Degree of challenge				
		Very High	High	Medium	Less	Very less
4	Proceeding the work before design changes are approved					
5	Contractors and consultants assign inadequate no of professionals in the site					
6	Contractors and consultants assign professionals with no specializations (like for sanitary & electrical installation)					
7	Experience of suing site book					
8	Not informing the permit and control office during the times where the project needs approval before passing to next stages					
9	Continuous change of professionals in the site					
10	Lack of contractors and consultant's knowledge (especially legal aspect)					
11	Professional participating in construction lack site experience					
12	Starting of the project work without available of materials					
13	client's limitless requirement changes					
14	Clients need for quick development of the project					
<b>Challenges coming from legislation</b>						
1	Authority given for inspectors is limited					
2	Executing of the project with approved design					
3	Time allotted for site visiting from the date of request by the applicant is insufficient					
4	Complicated inspection procedures					
5	Inadequate legislation supporting for project follow up					
6	Mutually uncoordinated and complicated legislation					
7	Out dated laws & standards that do not allow modern constructions					
8	No provision of trainings & making clarity about newly enacted or amended legislations					

No.	Challenges in project follow up	Degree of challenge				
		Very High	High	Medium	Less	Very less
9	Regulations requiring unreasonable requirements					
	<b>Challenges coming from internal environment</b>					
1	Lack of transportation facility for regular inspection					
2	Inadequate number of staffs					
3	Inefficient staff					
4	Inability of inspectors to cope up with the fast-growing technology					
5	Lack of inspector's technical knowledge and skill					
6	Contradicting designs approved by the design review team					
7	Limited Participation of field personnel in the design review stage					
8	No mechanism for documenting the lessons learned					
9	Documenting system					
10	Salary for inspectors is much lower than their effort					

### Section III: Open Questions

1. What are the major procedures followed during construction project follow up?

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2. What are the major phases where construction site inspections are mandatory?

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3. What are the major stakeholder activities in the site and its role?

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4. What documents are used to check the conformity of construction site activities?

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5. What mechanisms do you use to improve the capacity of your project follow up staff members? (Like short term trainings, short courses, regular education)

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