Interweaving zoning and design in road projects

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Abstract

Traditionally, the zoning and design phases in road projects are separated. The choices made during zoning impacts on design, and the designers often want to change the zoning plans after they are formally approved. To improve both zoning and design, the Norwegian Public Roads Administration (NPRA) has experimented with “interweaving zoning and design”. The purpose of this paper is to assess interweaving zoning and design, where the zoning and design is to be conducted as interweaving processes. Furthermore, it explores the benefits and challenges of interweaving zoning and design. At last, it assesses how this approach should be implemented in future projects. Following an initial literature study, three cases were studied, based on interviews and document studies. Case-specific semi-structured interviews were conducted with seven client representatives, one external consultant and one contractor’s consultant. The NPRA has conducted interweaving zoning and design in only a few projects, even though there are some apparent advantages with this approach. The findings indicate that the benefits of such planning are both a better product through more holistic zoning plans and design, and a better planning process through potentially time and cost savings. Interweaving zoning and design is preferable in projects where the project is going to be implemented within a few years. Financing represents a minor challenge, as the designers enter at an earlier stage than usual. The paper concludes that interweaving zoning and design is possible, it has been carried out successfully and has some distinct advantages. If the project implementation date is undecided, detailed design can be redundant due to change of regulations, scope and the political situation. This paper documents experiences from cases where interweaving zoning and design has proved advantageous. This approach seems to have a potential that more road projects could have benefitted from.

Keywords: design; early contractor involvement (ECI); interweaving processes; public clients; zoning plan

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1. Introduction

Traditionally, the zoning and design phases in Norwegian road projects are separated. The choices made during zoning impacts on design, and the designers often want to change the zoning plans after they are formally approved. To improve both zoning and design, the Norwegian Public Roads Administration (NPRA) has experimented with “interweaving zoning and design”. Interweaving between planning and procurement through communication and cooperation has proven to increase quality [8].

In Norway, there are many ways of obtaining municipality’s building permit for roads [5]. The most common way to obtain this permit is by getting the municipality council to approve a detailed zoning plan that regulates land use of the relevant area. The detailed zoning plans are legally binding and can be initiated by both private and public actors [9]. As a legal necessity, an approved zoning plan needs to be present before building a road. The zoning plan is also a precondition for political approval, and thereby funding. In the case of road projects, most zoning plans are initiated by the NPRA.

Several reports from different Norwegian Ministries and the NPRA showed that there might be room for innovation and improvements in the Norwegian road planning practice [3,7,12,14]. The reports assess various possible areas of improvement. Among the improvement areas are the working processes of zoning and design. With the traditional Norwegian zoning plan approach, an area can often be regulated for road purposes before the road is even close to being designed. When the design phase finally starts, the zoning plans can be insufficient because of change in political interests, scope, forecasted average annual daily traffic etc. In addition, the old zoning plan may have been planned without considering constructability to a sufficient degree.

The municipality typically considers the interests of several stakeholders. When approving the zoning plans, the interests of the designers and contractors are not always prioritized. The result may be that the zoning plans do not align with the practical needs of the designers. Sometimes, the contractors also want changes in the zoning plan. Changing a formally approved zoning plan can be both time consuming and expensive. This might be a result of so-called silo thinking – or zoning and design in sequential phases – where the zoning planners finish their work with an approved zoning plan before the designers enter. Pulling down such barriers has proven to be challenging [6].

The designers’ needs may be difficult to predict for the zoning planner, but may be obvious for the designer or the construction manager. It is, in fact, a tendency that insufficient design occurs due to sequential processes, not taking all aspects into account at an early stage [8]. This also leads to problems at the construction site [1]. Involving design competence into the zoning has been among the reasons for interweaving zoning and design. This may have some of the same advantages as involvement of construction competence in the design [22]. There has been done some research regarding the interweaving of road design into zoning [11]. These studies investigated system innovation and bringing together various system participants with different knowledge and skills.

The traditional approach with the zoning plan and design as sequential phases in road projects has apparent disadvantages, so alternative approaches should be assessed. This paper examines how interweaving zoning and design is executed in three cases, according to the following research questions:

- How does the NPRA implement interweaving zoning and design?
- What benefits and challenges occur in interweaving zoning and design?
- How should the NPRA implement interweaving zoning and design in future projects?

The work has three main limitations. Firstly, the research is limited to three Norwegian road projects initiated by the NPRA, restricting the validity of the findings for cases in other countries. Secondly, no stakeholders outside the project organizations have been consulted, even though the interviewees have referred to their opinions on the matter of involvement. Thirdly, the paper examines the early phase of zoning and design, and does not address the construction phase.

2. Theoretical framework

2.1. Zoning and design

In Norway, the zoning process is regulated by the plan and construction law ("Plan- og bygningsloven") [9]. The zoning plan is subordinated by the area development plan and is to provide detailed information about desirable land
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