

# Reinforcements in Opwierde-Zuid, Appingedam: the Social Impact on its Residents



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## Summary

For the last decade, earthquakes induced by gas extraction have caused damage to buildings in the province of Groningen. Consequently, the complete neighbourhood of Opwierde-Zuid in Appingedam, approximately 460 houses, needs to be reinforced, or demolished and reconstructed with earthquake resistant constructions and materials. This has a large impact on the lives of the residents of Opwierde-Zuid, forcing residents to move out of their homes for an extended amount of time, and entirely changing their homes and lives. As a result, this reinforcement project impacts them on all levels: material, emotional, physiological, social and economic. This study examines the sense of home of residents in Opwierde-Zuid in relation to the reinforcements. A total of nine interviews, with 5 couples and 4 individuals, have been conducted to indicate the social impact of the reinforcements on the residents. The findings show that a home means everything to most people, which symbolizes safety, comfort and rootedness. Due to the reinforcement project, the majority of the participants experience a change in sense of home. The main reasons are a decrease in enjoyment of residency, loss of control towards the home, actions of authorities, disagreement about housing plans and the negative experienced atmosphere in the neighbourhood. Three couples experience a sense of loss towards their homes, which means that project has caused a breaking of bond between these residents and their home. Participants experience a lack of influence in the reinforcement project, which decreases their lack of support towards the whole project. Most residents in Opwierde-Zuid do agree and are aware of the fact that their houses need to be reinforced. However, many residents disagree with how the current reinforcements are executed at this moment, due to the large impact it creates on their lives. Authorities should have involved the residents in the decision-making process of the reinforcement from the beginning. This could have reduced feelings of uncertainty, anger and powerlessness.

Keywords: sense of home, induced seismicity, earthquakes, social impact, Groningen

# Table of Contents

Summary .....	1
1. Introduction.....	4
1.1 Background .....	4
1.2 Research problem .....	4
1.3 Reading guide.....	5
2. Theoretical framework.....	6
2.1 Introduction .....	6
2.2 ‘Sense of home’ .....	7
2.3 Forced relocation .....	10
2.4 Disasters .....	11
2.5 Conceptual model .....	14
3. The context of the Groningen earthquakes and area of interest .....	15
3.1 History of the earthquakes in Groningen and its growing debate.....	15
3.2 Area of interest: Opwierde-Zuid, Appingedam.....	18
3.2.1 Opwierde-Zuid project(s) .....	19
3.2.2 Revitalising plan Opwierde-Zuid .....	21
3.3 Actors involved in Opwierde-Zuid.....	22
4. Methodology .....	24
4.1 Research Method .....	24
4.2 Semi-structured interviews and on-site observations .....	24
4.2.1 Interview content and structure .....	24
4.2.2 Recruitment of participants .....	25
4.3 Data analyses .....	27
4.4 Sensitivity of the topic.....	28
5. Results .....	30
5.1 Housing and neighbourhood plans .....	30
5.1.1 Housing plans .....	30
5.1.2 Neighbourhood revitalising plans .....	33
5.1.3 Temporary relocation .....	34
5.2 Sense of home and place attachment .....	35
5.2.1 Housing satisfaction and damage to homes .....	36
5.2.2 Postponement of renewal and conservation of the house .....	37
5.2.3 Changing in ‘Sense of home’ .....	38
5.3 Neighbourhood attachment and atmosphere .....	39

5.4 Actions of authorities .....	41
5.4.1 Communication.....	41
5.4.2 Lack of influence .....	42
5.4.3 (Increase) in loss of trust.....	42
5.4.4 Uncertainty regarding the gas extraction decision-making.....	43
5.4.5 The Netherlands vs. the Groningen earthquake area.....	44
5.5 Psychological and emotional impacts .....	44
5.5.1 Emotional impacts .....	44
5.5.2 Impact on health .....	45
5.5.3 Impact on close relationships .....	46
5.6 Overall experience .....	46
6. Conclusions and discussion .....	48
7. Reflection.....	51
8. Personal recommendation .....	53
References.....	54
Appendix 1: Interview Guide.....	63

# 1. Introduction

## 1.1 Background

Due to earthquakes occurring in the province of Groningen, the complete neighbourhood of Opwierde-Zuid in Appingedam needs to be renovated. Approximately 460 houses, of which the majority rental houses, must be either reinforced or demolished and reconstructed with earthquake resistant constructions and materials (Nationaal Coördinator Groningen, 2017). The earthquakes are a result of gas extraction activities by the Nederlandse Aardolie Maatschappij (NAM) (Van der Voort & Vanclay, 2015). The NAM is extracting gas in the northern part of the Netherlands since 1960 and over a thousand earthquakes have been recorded since then (KNMI, 2017). The largest earthquake recorded in this area had a magnitude of 3.6 on the Richter magnitude scale and occurred in 2012 in Huizinge (KNMI, 2017). After this event the consequences and the concerns of extracting the gas gained a higher priority in the region, politics and in the media. More recently, on the 8<sup>th</sup> of January 2018, the third largest earthquake so far occurred in Zeerijp, Groningen. It had a magnitude of 3.4 on the Richter magnitude scale and resulted in further concerns and dissatisfaction among the Groningers (RTV Noord, 2018). As a response to this event and the ongoing gas extraction a large torchlight procession was organized in the city of Groningen. The estimated numbers of participants were approximately 10.000, which is increasingly higher than the first torchlight procession that was held in Groningen in 2017 (DVHN, 2018). The earthquakes in Groningen influence the enjoyment of living in this area. Especially, damage to properties, feelings of unsafety and the fear and insecurity for future earthquake risks, decreases people's quality of living (Sociaal Planbureau Groningen, 2014). Moreover, the earthquakes are also causing non-material damage sufferings (NOS, 2017). Postmes et al., (2018) reported that the health of residents with multiple damage to their homes, significantly decreased within the year 2016-2017. These people have a higher risk of stress-related health issues such as burn-outs. They also conclude that there is an increase of lack of trust towards authorities among Groningers, which aggravates their feelings of unsafety (Postmes et al., 2018). Additionally, Postmes et al., (2018) conclude that the lack of trust and feelings of injustice can affect people's health. So far, the earthquakes already resulted in heated debates among the Groningen residents, politicians and the NAM and this reinforcement project in Opwierde-Zuid can be a further challenge for all parties.

## 1.2 Research problem

The aim of this thesis is to research the social impact that the reinforcement project Opwierde-Zuid in Appingedam has on the residents of this neighbourhood. The project may have a big impact on the residents' lives, as some of the residents have to move out for a longer time period or have to move into a new house. Forced movement may cause stress, distress and grief (Fried 1963). Furthermore, not only people's dwellings will change, but their 'sense of home' can also change. Over the years, people often invest much in their house, both financially and emotionally, making their house a 'home' (Carroll et al., 2009; Case, 1996). The bond between people and their sense of being at home can break when their house changes, or when they are forced to move into a new one (Carroll et al., 2009). Additionally, the neighbourhood is also changing, which may also contribute to the changing of 'sense of home'.

### **Research question:**

What are the social impacts of the reinforcement project Opwierde-Zuid in Appingedam on the residents of this neighbourhood?

***Sub questions:***

1. What are the potential social impacts of reinforcement projects?
2. How does the reinforcement project impact the residents' sense of home?
3. Which parties are involved in the Opwierde-Zuid reinforcement project, what are their roles and perceptions in the reinforcement project and how does this impact the residents?

Sub question 1 will be mainly discussed in the theoretical framework. Sub questions 2 and 3 will be further discussed throughout the whole thesis.

### 1.3 Reading guide

The theoretical framework will be critically discussed in chapter 2. It incorporates an overview of 'sense of home', forced relocation, and disasters, which are all important in the discussion regarding the Opwierde-Zuid reinforcement project. Chapter 3 elaborates on the context of both the Groningen earthquakes and the area of interest. The different actors involved in the reinforcement project are discussed as well. Chapter 4 explains the methodology that is being used in this research, and devotes attention to ethical considerations. The results are presented in chapter 5. Chapter 6 contains the discussion and final answer to the research question. In chapter 7 we reflect on this research and the decision we made. Chapter 8 finishes with a personal recommendation on using social impact assessments in reinforcement projects.

## 2. Theoretical framework

### 2.1 Introduction

The reinforcement project Opwierde-Zuid in Appingedam entails the reinforcement or demolition and reconstruction of the entire neighbourhood of Opwierde-Zuid with earthquake resistant constructions and materials. The renovation is of great importance due to earthquake risks and already existing damage to many houses in Appingedam (Nationaal Coördinator Groningen, 2017). The damage claims are still rising rapidly in the Groningen earthquake area, especially after another earthquake occurs (NOS, 2016). The earthquake that took place on the 8<sup>th</sup> of January 2018 in Zeerijp, had a magnitude of 3.4 on the Richter scale, which resulted in more than 5600 damage claims. It was one of the strongest earthquakes in Groningen so far (NAM, 2018; NOS, 2018). The earthquakes and as a consequence, damage to houses, have resulted in feelings of unsafety among the Groningen residents in their own house (Nationaal Coördinator Groningen, 2015; CMO STAMM & Sociaal Planbureau Groningen, 2016). This is in contrast with the idea that a house should function as a place of safety for people (Fonad et al., 2006).

The reinforcement project Opwierde-Zuid in Appingedam will not only change the residents' dwellings, but it may also have impact on their lives. This can be due to the fact that many residents in this neighbourhood have to move to temporary housing for several months and return to a (partially) different house (Nationaal Coördinator Groningen, 2017; NRC, 2017). This thesis will focus on the sense of 'being' and 'feeling' at home of the Opwierde-Zuid residents. Therefore it is important to devote attention to the sense of home that residents in general experience, which will be discussed throughout the literature section. The concepts of place attachment, place identity and place alienation play their part in explaining the concept of 'sense of home' and how this can change when a disaster, such as an earthquake, occurs. Moreover, attention will not only be devoted to the concept of home, but also partially to a wider context, the neighbourhood. Due to the change in dwellings and environmental changes, e.g. more parking- or green space, the neighbourhood will also transform (Nationaal Coördinator Groningen, 2017). Lastly, based on different studies in which people lose their home due to disasters and policy making, the impact of losing a home will be discussed. Socio-demographic, socio-economic, socio-political and psychosocial impacts of disasters will be included in this discussion. These aspects are relevant, as the earthquakes in Groningen are a human-made disaster, as will be elaborated in section 2.4.

In some, but not in all aspects, this research will follow a social impact assessment (SIA) approach. According to Vanclay (2003, p.5) a 'social impact assessment includes the processes of analysing, monitoring and managing the intended and unintended social consequences, both positive and negative, of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions'. Not every aspect of Vanclay's definition will be used, as this research only analyses the current social consequences and changes triggered by the reinforcement project on the residents of Opwierde-Zuid. Vanclay (2003) explains that social impacts include all issues that affect people, regarding a planned intervention. Changes related to the following aspects can be seen as having a social impact:

- 'People's way of life – how they live, work, play and interact with each other on a day-to-day basis;
- Their community – its cohesion, stability;
- Their environment – the level of hazard or risk, dust and noise they are exposed to; their physical safety, and their access to and control over resources;
- Their political systems – the extent to which people are able to participate in decisions that affect their lives;
- Their health and wellbeing;

- Their personal and property rights – particularly whether people are economically affected, or experience personal disadvantage;
- Their fears and aspirations – their perceptions about their safety, their fears about the future of their community, and their aspirations for their future and the future of their children’ (Vanclay, 2003, p.8)

The aspects described above were used as a guideline for this research. The interview questions were built around these seven aspects and they are analysed and discussed in the context of Opwierde-Zuid. These aspects contributed to creating an overview of the social impacts.

Due to time constraints, this research will not follow all the exact rules and steps conducting social impact assessments as described by Vanclay et al., (2015). This will be explained in the following paragraph.

The focus in this research will be more on the social consequences for the residents and less on the other actors that are involved in the project, such as the municipality of Appingedam or the National Coordinator Groningen. The position of these parties will be discussed in paragraph 3.3. Burdge & Vanclay (1996) and Vanclay et al., (2015), highlight the importance of conducting a SIA, especially before the start of any project that could have an impact on a community. A new project often creates uncertainty and stress, as inhabitants do not know what to expect. A social impact assessment can reduce these uncertainties, by involving the communities in the decision making process upfront, instead of only consulting them. At the same time, the support for the planned intervention among the community, could increase. Although a social impact assessment is often used at the start of a project, Vanclay et al., (2015) argue that it is equally important to evaluate the ongoing social impacts throughout the whole project. This research did not take place before the reinforcement project in Opwierde-Zuid started, but is conducted after the reinforcements plans are already made, and in some cases already executed. Therefore it does not include all the aspects of the first two phases of a social impact assessment, including aspects such as predicting impacts and understanding a proposed project. Moreover, this research does not include all the aspects of the last two phases, as the reinforcement project is still continuing.

## 2.2 ‘Sense of home’

In the case of the reinforcement project Opwierde-Zuid, home is the key concept that needs to be covered. Firstly, a distinction must be made between a house and a home. A house is a building, with walls, doors and a roof. It is a building where people can live in. A home however, can be anywhere and does not necessarily have to relate to the house itself (Rykwert, 1991).

The concept of home is already intensively discussed in the literature, but it remains difficult and unequivocal to define, because home can differ in meaning (Lewicka, 2011). As Lewicka (2011) notes, the definition of home can vary from a house to an entire neighbourhood and therefore the meaning differs per person. However, people mostly associate the concept of home with their actual dwelling (Lewicka, 2011). A home is a multidimensional concept and is subjectively experienced by people. Home has a meaning on the social, emotional and material levels in life and a home is respected much by people (Parsell, 2012). It can symbolize ‘continuity, order, rootedness, self-identity, attachment, privacy, comfort, domesticity, security and refuge’ (Case, 1996; Lewicka, 2011, p.211; Moore, 2000). A home can also be central to family life, functioning as a place where people can develop and maintain the relationships with others, such as their partners or children, and can show proudness of ownership (Carroll et al., 2009). The house could eventually become so familiar that it becomes part of people’s daily routine and creates a sense of ‘being at home’ (Case, 1996). Moreover, home can function as a private environment for people to withdraw and it is also a place to include or exclude others from (Falk et al., 2012). Home is also a place of feeling of safety and a place of memory (Fonad et al., 2006; Ratnam, 2018).

According to Jorgensen & Stedman (2001, p. 233) the concept 'sense of place' is used to describe the relationship between people and their spatial settings. Sense of place consists of three elements: place dependency, place identity and place attachment (Jorgensen & Stedman, 2001). All are widely discussed in academic literature and almost all, except place dependency, can be used to understand what home means in the context of the Opwierde-Zuid reinforcement project. These concepts have different meanings, although they overlap in certain ways (Carroll et al., 2009). Moreover, the concept of place alienation will also be explained (in paragraph 2.4) as it is relevant in the discussion of the reinforcement project of Opwierde-Zuid.

Firstly, place dependency is seen as a functional attachment and 'reflects the importance of a place in providing features and conditions that support specific goals or desired activities' (William & Vaske, 2003, p. 831). Although some residents might work at home, this concept of place dependency is less relevant to discuss in the case of Opwierde-Zuid, as the focus in this concept 'depending on a place to achieve goals' is less important within the research topic. Therefore, we will devote no further attention to this concept.

Secondly, William & Vaske (2003, p. 381) define place identity as 'the symbolic importance of a place as a repository for emotions and relationships that give meaning and purpose in life'. The definition of William & Vaske (2003) describes the importance of places in our daily lives and indicates that, as humans, we are intertwined with those places. Place identity is here defined as an 'identity of a person' formed and shaped by a place, which is opposed to the idea of an 'identity of a place' where an identity is ascribed to the place itself (Rijnks & Strijker, 2013). A place can also function as the expression of the identity of people. As a result, places have a role in creating emotions. 'Feeling at home' is one of the emotions that is related to place identity. 'Feeling at home' expresses the relationship of someone's identity towards its environment. It is a place-based emotion because a place receives meaning by and through social and cultural exchanges that occur in that place. (Van der Graaf & Duyvendak, 2009). Place identity is shaped by both physical components, including home, work place, school and neighbourhood, and by the emotional attachment between a person and a place (Bott et al., 2003; Proshansky et al., 1983; Wang & Xu, 2015). People's daily routines are mostly performed in these physical components and as one of these components changes, an interruption in daily life can occur (Carroll et al., 2009; Proshansky et al., 1983). This might also occur during the Opwierde-Zuid reinforcement project, as many families have to move into a temporary house, or stay in theirs during renovations. Moreover, the neighbourhood will be entirely renovated, which will be a large operation, which may cause annoyance for the entire community (Nationaal Coördinator Groningen, 2017). Xue et al., (2015) conclude that construction work can cause damaged roads, resulting in annoyance to residents living next to a construction site. Furthermore, Shepherd et al., (2013) did research on the effects of environmental sounds on people. They concluded that disagreeable soundscapes can create a sense of annoyance, while positively experienced soundscapes can have a healing effect. Golmohammadi et al., (2013) add that noise from construction sites can create a sense of annoyance. The World Health Organization (2011) conclude that annoyance is an environmental health burden, because it can affect people's physical, mental and social well-being.

Thirdly, the concept that is most relevant in this research is place attachment. Brown & Perkins (1992, p. 279) describe that 'place attachment processes normally reflect the behavioural, cognitive, and emotional embeddedness individuals experience in their socio-physical environment'. Place attachment is often seen as the positive bond that people have with a particular place (Hidalgo & Hernández, 2001). Place attachment can occur on different place scales. For example, on the local level, home is one of the places people can get highly attached to (Lewicka, 2011). Moreover, Lewicka (2011) indicates that research conducted on place attachment is mostly focused on neighbourhood attachment and less on attachment to home. Despite the fact that place attachment to homes will be the main focus in this research, attention will also be given to neighbourhood attachment, as it relates to the changes in the Opwierde-Zuid neighbourhood.

Brown et al., (2003) and Harris et al., (1995) note that place attachment towards dwellings can also contribute to people's well-being, by providing a sense of safety, stability and acquaintance. This relates to Lewicka's (2011) idea about the different aspects that symbolise a home, which was already mentioned earlier in this section. Lewicka (2011) also discusses the relationship between place attachment and years of residence. Several academics have pointed out that people who live in a certain area longer are more likely to be more attached to that area (cf. Brown et al., 2003; Lewicka, 2011; Sampson, 1988). Zwiers et al., (2016) add that residents who live in a certain place longer have the possibility to experience more nostalgic feelings towards it. This results in a 'stability-oriented attachment', which indicates that residents are more willing to protect their actual living environment. Therefore, these residents have potentially more difficulties to adapt to changes.

The residents of Opwierde-Zuid are faced with many changes in their living environment and it is not clear in which way they can and are willing to adapt to these changes. There might also exist a difference between age groups in adapting to changes in Opwierde-Zuid, as older people seem to experience a higher attachment to their homes and neighbourhood than younger people, a home becomes more important as people get older (Brown et al., 2003). Elderly people's memories of their lives are embedded in the homes and all the years of residency can have resulted to a deepening of their roots in the place (Gillsjo & Schwartz-Barcott, 2011). This relates to the earlier discussion about place attachment and length of residency.

On the other hand, there are academics that did not find significant relationships between place attachment and length of residence in their research projects (cf. Scannel & Gifford, 2010). Scannel & Gifford (2010) for example studied the relation place attachment and length of residency in two proximate towns, Trail and Nelson, in Canada. Trail showed a relation between place attachment and length of residence. However, Nelson, in which the residents reported to be more highly attached than in Trail, showed no significant relation.

Moreover, it is questioned if newcomers can develop an equal place attachment to their new place of residence as locals. Gieling et al., (2017) indicate that new rural residents can also have a strong attachment towards their new living environment, due to the fact that people nowadays are more likely to move around to find a suitable place to live. However, Gieling et al., (2017) do not make a distinction between homeowners and tenants, as tenants, especially those depending on social housing, often have less choice in the housing market (Kleinhans & Van der Laan Bouma-Doff, 2008). Increased affordable mobility could be an important explanation as to why people can buy a house of their preference (Verkade et al., 2006). In their research, Gieling et al., (2017) discuss mobility in relation to people's attachment towards a place. Residents who are more mobile are likely to experience different types of attachment towards their living environment and to multiple places than residents who are less mobile. However, mobility does not necessarily cause a less strong attachment towards a place or vice-versa. In fact, Barcus & Brunn (2010) and Gieling et al., (2017) suggest that innovations in technology, communication and mobility have made it possible for people to remain in close contact with different places, and have strong attachment to multiple places.

While both Gieling et al., (2017) and Verkade et al., (2006) do not discuss tenants in their research, the knowledge of tenants' behaviour might be important in the Opwierde-Zuid research as part of the neighbourhood exists of rental houses. The discussions of Rohe & Stewart (1996) and Brown et al., (2003) on the differences between homeowners and tenants in place attachment, social participation in neighbourhood and financial investment in properties are therefore relevant. They suggest that homeowners are generally more attached to their neighbourhood, as opposed to tenants merely renting their homes. They usually stay longer, are more eager to participate in social activities, promoting the neighbourhood's stability and have greater place attachment. Furthermore, homeownership also leads to better property conditions as homeowners are financially investing in

the area and therefore want to take more care of the property (Brown et al., 2003; Rohe & Stewart, 1996).

Furthermore, Brown et al., (2003) also suggests that higher attachment to the neighbourhood occurs with people who are more actively engaged in their neighbourhood. People do not only feel attached to their neighbourhood as a place but also to their neighbours. However, it can occur that people only feel attached to their homes but not to the people who live in their neighbourhoods, and vice-versa (Van der Graaf & Duyvendak, 2009).

### 2.3 Forced relocation

People often decide to move when their living environment no longer matches their needs or aspirations (Popp, 1976). The stress-threshold model developed by Wolpert (1965) and Brown and Moore (1970) relates to this, as they explain that people decide to move if their dissatisfaction towards the location reaches a certain threshold. This threshold differs per person and is a result of people's experiences and aspirations over time (Wolpert, 1965). Speare et al., (1975, p. 175) build on this, and distinguishes three stages within the migration process: 'the development of a desire to consider moving, the selection of an alternative location and the decision to move or to stay'.

Not everyone may choose to move voluntarily and in some cases, such as in Opwierde-Zuid, it is forced by external forces. Mandatory relocation might be caused by reasons such as divorce, handicap, fire or in this case housing reconstruction, and not by dissatisfaction towards the dwelling and living environment (Popp, 1976).

Research has shown that people who are forced to move out of their homes, can experience a loss of 'sense of home' and the bond they have with their living environment (c.f. Bolt et al., 2011; Carroll et al., 2011; Van der Graaf & Duyvendak, 2009). This experience of loss of 'sense of home' might be stronger or different in the context of forced relocation, as opposed to when people voluntarily decide to move. Fried (1963) already concluded that people who are forced to move out of their homes could experience grief and distress. As Van der Graaf & Duyvendak (2009) explain, the sense of feeling at home is difficult to express and formulate, and people only become aware of this when they leave the place or when the place changes, and the feeling of being at home has changed consequently.

Huff & Clark (1978) explain this more in-depth with two different concepts. It seems that these concepts are similar to the relationship between place attachment and length of residence. However, these concepts are explained in the context of forced relocation and therefore interesting to note as well. Despite that the residents in Opwierde-Zuid are most probably returning to the same place, they might experience the issues that Huff & Clark (1978) explain. Huff & Clark (1978) indicate that forced relocation is a result of two processes: cumulative inertia and residential stress. Cumulative inertia means that there is a resistance towards moving. Residential stress reflects on the dissatisfaction of residents towards their dwelling and living environment. Huff & Clark (1978) explain through the concept of cumulative inertia that the probability to move decreases through time. Thus, the longer people live in the same dwelling or neighbourhood, the more they become attached to it through memories, social relations and physical belongings they have purchased. The created ties towards the place become stronger and are therefore more difficult to break, whereby the resistance to move increases. Secondly, they explain the concept of cumulative stress in the context of forced relocation. A forced relocation is positively experienced if the cumulative stress is higher than the cumulative inertia. Hereby, residents are already so dissatisfied with their current dwelling or neighbourhood, therefore they see the relocation as an opportunity to realize their future relocation plans earlier than planned (Huff & Clark, 1978; Kleinhans & Kruythoff, 2002).

The two concepts can relate to the reinforcement project of Opwierde-Zuid as their might exists a resistance to this forced relocation. However, at the same time a possible dissatisfaction between the

residents and their current dwelling might also be the case. This can be due to the fact that the houses in Opwierde-Zuid were declared unsuitable for living and people do not like living in a house where they feel unsafe (Postmes et al., 2018; Nationaal Coördinator Groningen, 2017).

To continue on this, Kleinhans (2005) defines 'affliction' as the sense of loss and nostalgic feelings that might occur between residents and their former home or neighbourhood. The more attached people are the more they bond with the place, the stronger the possibility that affliction will occur when people have to leave their home or neighbourhood (Kleinhans, 2005; Fried, 1963). Thus, both Kleinhans (2005) and Huff & Clark (1978) conclude that the longer residents live in the same place, the more attached they will be towards that place and this can result in more affliction after forced relocation.

Revitalizing neighbourhoods is a widely discussed context when it comes to forced relocation (cf. Graaf & Duyvendak, 2009). Although the events in Opwierde-Zuid differ from issues that occur due to revitalizing neighbourhoods, there are also some similarities, which can be interesting to note. Van der Graaf & Duyvendak (2009) did research on the effects of revitalizing neighbourhoods and the impact that has on resident's sense of feeling at home. In revitalizing neighbourhoods, residents often have to move out of their homes for ever, however some do move back, but return to a place that has changed so much it can be difficult to recognize. This is in contrast with Opwierde-Zuid where, unless decided differently by the residents themselves, almost all the residents will return to their former house or housing location (Nationaal Coördinator Groningen, 2017). However, the houses are being demolished and reconstructed or renovated which might cause difficulties in recognizing parts of the house. Similarities with revitalization of neighbourhoods are also the insecurity and fear among residents, raising questions about their future residency (Van der Graaf & Duyvendak, 2009).

Bolt et al., (2011) discusses the effects of moving on residents in revitalizing neighbourhoods. He indicates that some may lose their social network by forced movement. This is when people do not return to their former homes, whereby they can lose the contacts they had with their neighbours. Bolt et al., (2011) also note that neighbourhood revitalizing can also raise opportunities, because the quality of the houses will be improved. This is also the idea behind the reinforcement project, as the houses in Opwierde-Zuid are being reinforced or demolished and reconstructed with earthquake resistance constructions and material to improve the quality of houses (Nationaal Coördinator Groningen, 2017). Moreover, Bolt et al., (2011) also indicate that the revitalisation of the neighbourhood can improve public spaces and can create a more attractive neighbourhood.

## 2.4 Disasters

A substantial body of literature has been devoted to disasters and their impact on humans (Galea et al., 2005). Although there is no universal definition of a disaster, it is defined here as 'an incident that is extremely harmful and disruptive' (Tierney et al., 2001; Neria et al., 2008). Every day, a disaster (e.g. a flood, earthquake, terrorist attack) takes place somewhere in the world, severely impacting the people experiencing it (Norris et al., 2002). This is also the case in Groningen, where earthquakes that are caused by human actions, which will be discussed further in this section, are profoundly impacting the people living in this region. Therefore, we can conclude that the event that is impacting the Groningen residents can be seen as a disaster.

While discussing the different impacts of disasters on communities, Lindell & Prater (2003) give a clear overview of this. They discuss community impacts of natural disasters and indicate that the social impacts include physical, socio-economic, socio-political and psychosocial impacts.

The most important physical impact of a disaster is damage to property, especially homes and their contents. Lindell & Prater (2003) indicate that, especially in earthquake risk areas, it is of great

importance to strengthen houses, protecting residents and their personal belongings. Although earthquake resistant buildings themselves are not likely to be damaged, the chances that contents are damaged are still high, as the contents of a house are not often securely fastened. Moreover, 'People experience damage done to the homes they cherish as damage to themselves' (Erikson, 1994, p.117). Over time, people invest much in their house, personally, emotionally and financially, making the house a home. A disaster does not only bring anxiety for peoples' own safety, but also for their homes and possessions. Damage to their house can put this personal investment at risk (Carroll et al., 2009; Erikson, 1994; Tapsell & Tunstall, 2008).

Carroll et al., (2009), Erikson (1994) and Tapsell & Tunstall (2008) discuss the impact of a disaster on the personal investment of people in their homes. As Carroll et al., (2009) note, people's personal identity, the private, secure environment and the control they have on their homes disappear when a disaster occurs. The control on the houses in Opwierde-Zuid, Appingedam is now partially in the hands of outside organisations, as they are in control of renovations and rebuilding. Carroll et al., (2009) argue that replacement of goods and restoration of homes are not the same when it is not done voluntarily, but instead decided by others of how and when it is taken place and by whom. People show a reflection of their personal identity in their homes through decoration and personal taste. It is therefore important that people can have influence on the renovation process and the eventual appearance of the house. The loss of personal belongings and damage to homes cannot always be replaced or restored and therefore it causes a breaking of bonds between the past and the present. The bond between people and their home can break due to destruction and displacement (Carroll et al., 2009; Tapsell & Tunstall, 2008).

Carroll et al., (2009) also explains the last concept that needs to be discussed from section 2.2, place alienation. Place alienation can be used to explain the changing feelings towards a home. They note that disasters affect and often even break the bonds of continuity, routineness and the attachment between people and their home. When disasters take place, a home can change from a personal belonging to an impersonal anonymous property. Place alienation includes the estrangement and loss of control towards a place (Buchecker, 2009; Claassen, 2003; Carroll et al., 2009). Carroll et al., (2009) explain several alienating experiences between people and their homes after a disaster has occurred, which may fit well in the context of Opwierde-Zuid. Alienating experiences are, for example, displacement within the home. This happens when people still live in their house, but do not feel attached to it anymore. Also, living in a temporary accommodation can be an alienating experience, as people can feel like outsiders in their temporary house. Lastly, alienation with the neighbourhood can also take place when the neighbourhood feels different after changes have occurred, such as changes in housing or environment (Carroll et al., 2009).

Secondly, property damage also has socio-economic consequences, as both the cost of renovation or replacement of the house, as well as the loss in asset value, have a high financial impact on the residents and the government (Lindell & Prater, 2003). Research has shown that homeowners in the Groningen earthquake area have more difficulties selling their houses as compared to the rest of the Netherlands. The housing market is hampered as a result of the damaged reputation of Groningen (CBS, 2016; De Kam & May, 2017; Duran & Elhorst, 2018). Additionally, a socio-economic consequence of earthquakes can also be experienced as alienating. The alienating experience occurs when the bond between a person and house is broken, and trying to sell the place remains difficult and costs too much time (Carroll et al., 2009). This doesn't only impact home owners, as tenants can also experience financial losses due to disasters, like moving costs and replacement of damaged furniture.

Thirdly, both Lindell & Prater (2003) and Tapsell & Tunstall (2008) discuss the possible political disruption after a disaster occurs, but from a different angle. While Tapsell & Tunstall (2008) discussed the relationship between state and community, Lindell & Prater (2003) discuss the possible disruptions within the community. Lindell & Prater (2003) note that the recovery period of a disaster, in which

people have to move into a temporary home, can lead to frustrations and possible community conflicts. One of the possible community conflicts can arise out of people's different ideas about the goals of recovery. It can happen that one part of the community wants the neighbourhood as it was before the disaster took place, while the other part sees it as an opportunity to change the neighbourhood (Lindell & Prater, 2003). A disaster can eventually physically change the whole living environment, but it can also lead to insecure feelings towards the environment as a place to live (Tapsell & Tunstall, 2008). In Groningen this is a main point of discussion, as many residents feel unsafe in their living environment. Due to the increasing number and magnitude of earthquakes, the feelings of insecurity and unsafety among the Groningen residents will not disappear any time soon (NAM, 2018; CMO STAMM & Sociaal Planbureau Groningen, 2016). The limited actions by and understanding from the Dutch government and NAM, as well as that the earthquakes are human-made, just makes matters worse (CMO STAMM & Sociaal Planbureau Groningen, 2016). According to Tapsell & Tunstall (2008), the actions local authorities take following a disaster are of great importance. When authorities do not respond as adequately as victims want, loss of trust will occur. Tapsell & Tunstall (2008) discussion is most noticeable in the context of Groningen, as the relationship between the residents of Groningen and the government is under high pressure, while friction between the communities itself are until now less noticeable.

Lastly, the psychological impact of earthquakes on the inhabitants of Groningen is becoming more noticeable and acknowledged (CMO STAMM & Sociaal Planbureau Groningen, 2016; Postmes et al., 2018). Lindell & Prater (2003) discuss psychological impacts of disasters, similar to the psychological impacts that several residents of Groningen experience. Victims can show symptoms such as fatigue, anxiety, depression and grief due to the disaster itself, which can eventually lead to post-traumatic stress disorder. But several academics note that the aftermath of natural and human-made/technological disasters can have an additional impact on the psychological health and well-being of victims. For example, living in temporary housing for an extended period of time (Carroll et al., 2009; Erikson, 1994; Galea et al., 2005; Tapsell & Tunstall, 2008; Verger et al., 2003).

The study of Erikson (1994) can be used to discuss the individual and collective trauma as a consequence of disasters. Disaster can traumatise individual people, or entire communities. On the one hand, traumas can bond and create communities, on the other hand they can drive communities apart (Erikson, 1994). Carroll et al., (2009) and Imperiale & Vanclay (2016) explain that a disaster can strengthen the ties with family members and neighbours through helping and taking care of each other during the aftermath of a disaster. However, Carroll et al., (2009) indicates that it can also set relationships under huge pressure, eventually leading to a split of families or break ups. A cause for this can be that people keep having difficulties with their daily routine when they are relocated to a temporary accommodation. The accommodation does not function as a home in the way their former house did. Verger et al., (2003) indicates the importance of doing research on this topic, because it helps to understand the support victims need to receive after a disaster takes place.

Erikson (1994) makes a distinction between natural and human-made/technological disasters based on their origin. Natural disasters are seen as something that happens to us as humans and are experienced as an event that is out of our reach. In contrast, human-made/technological disasters are caused by human actions. Examples are airplane crashes, nuclear disasters, mass-violence and the earthquakes in Groningen.

Human-made/technological disasters are seen as preventable, someone can be eventually blamed for the event. Moreover, it seems that a difference between the psychological impact of human-made/technological disasters and natural disasters might exist. Galea et al., (2005) and Neria et al., (2008) did research on post-traumatic stress disorder caused by these two types of disasters. They argue that the incidence of post-traumatic stress disorder among victims of human-made/technological disasters is higher than among victims of natural disasters. However, they do both also acknowledge that this could be due to differences in sampling sizes between indirect and direct

victims. For natural disasters, direct victims are harder to identify, as the disaster usually affects large areas in different ways. In contrast Human-made/technological disasters usually impact smaller areas or localized groups.

While earthquakes are regarded as natural disasters in most literature, the Groningen earthquakes are unique in the sense that they result from gas extraction, and are therefore human-made.

## 2.5 Conceptual model

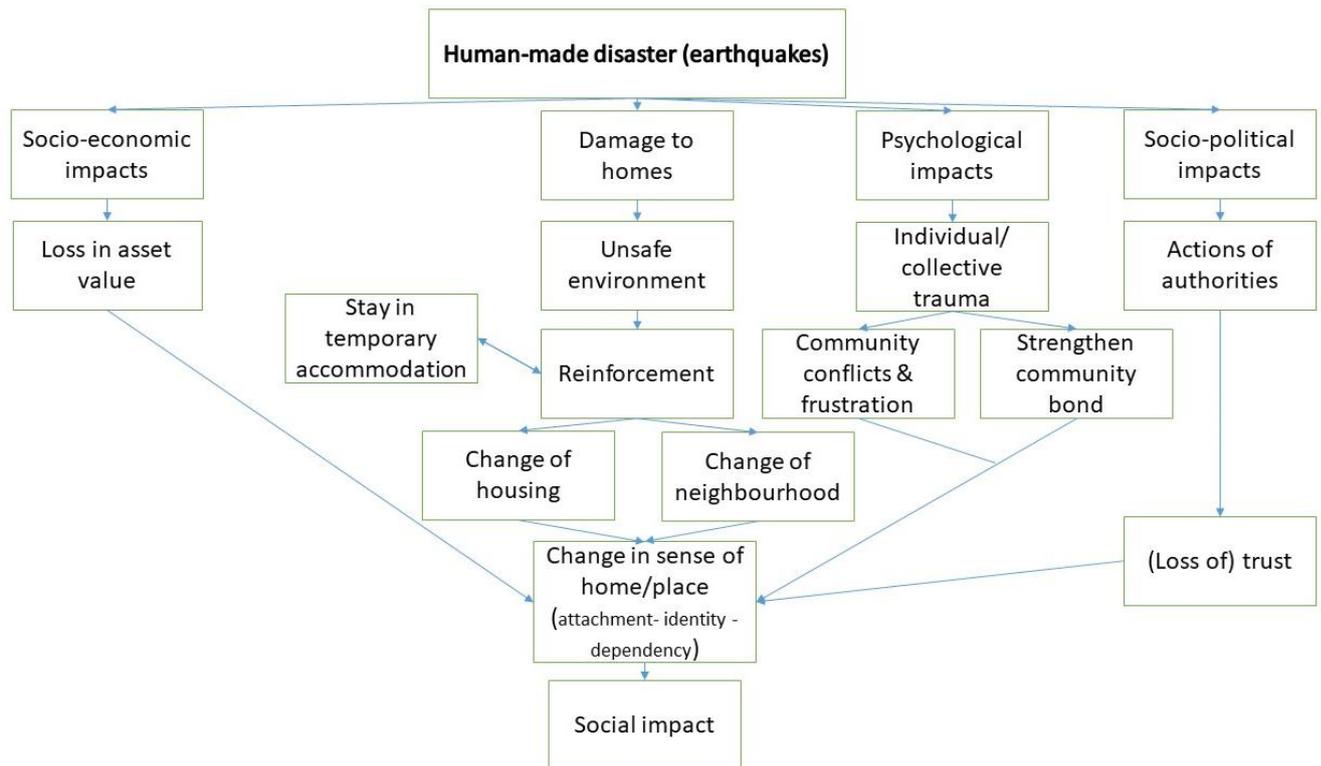


Figure 1. A human-made disaster, in this case earthquakes, has several impacts on the residents living in the affected area. Firstly, residents experience socio-economic impacts, of which the most important one, the loss in asset value. Secondly, houses are being damaged, which creates an unsafe environment. Therefore houses need to be reinforced, which results in changes of housing or/and neighbourhood. During the reinforcement residents have to move to a temporary accommodation, which also might have impact on them. Thirdly, a human-made disaster can create psychological impacts, which results in an individual or/and collective trauma. This can cause community conflicts and frustrations or it can strengthen the community bond. Lastly, the socio-political impacts, especially the actions of authorities after a disaster occurs are either creating trust or distrust among residents. All these impacts can change the residents' sense of home/place. Together, this gives an overview of the social impact of the human-made disaster (earthquakes) that is taking place.

### 3. The context of the Groningen earthquakes and area of interest

#### 3.1 History of the earthquakes in Groningen and its growing debate

In 1959, one of the largest natural gas fields in Europe was discovered in Slochteren, in the northern part of the Netherlands (NAM, 2017). The gas field contained circa 2600 billion cubic meters (bcm) gas before extraction began, making it the tenth largest gas field in the world (NAM, 2017; Ranke, 2016). The gas is extracted by a monopolist, the Nederlandse Aardolie Maatschappij (NAM) (Koster & Van Ommeren, 2015). Shell and Esso established the NAM in 1947, originally as the name shows, to search for and produce oil in the Netherlands, but shifted its priority towards gas after discovering the Groningen gas field (NAM, 2017). The gas field, which is shown in figure 2, covers almost 40% of the province of Groningen, where approximately 367.604 people live. About 200.000 of these are living in the city of Groningen itself (Van der Voort & Vanclay, 2015; Nationaal Coördinator Groningen, 2015).



Figure 2. The Groningen gas field. Sources: KNMI (2018); NAM (2018).

Circa 90% of the gas revenues from the Groningen field flow to the Dutch government, NAM receives the other 10% (NRC, 2018). In 2016, the Dutch government received 2,6 billion euros in profits from gas extraction, with this amount being a lot higher several years earlier, at 15,4 billion euros in 2013 (CBS, 2017; Koster & Van Ommeren, 2015). This decrease is a result of a reduced gas production in recent years. In gas year 2016-2017 (running from October 2016 to September 2017) the NAM produced nearly 24 billion cubic meters of gas from the Groningen field, down from 45 billion cubic meters in 2013-2014 (NAM, 2017).

Gas extracting is important for Dutch society, as gas is used for cooking and heating in almost all Dutch households, as well as in its neighbouring countries (Koster & Van Ommeren, 2015). Aside from this, a share of the Dutch government's income comes from gas exports, and as said before, the Dutch government receives the majority of profits from the Groningen and other gas fields where NAM produces (NOGEP, 2018). So far, the government has used these gas revenues for general resources and has invested it in infrastructure, sustainability and knowledge development (CBS, 2015). Only a

small amount of the gas revenues has indirectly ended up in the province of Groningen (RTV Noord, 2015; AD, 2017).

Besides these positive aspects, gas extraction in Groningen has also its negative consequences, mainly on ground subsidence and earthquakes (Koster & Van Ommeren, 2015; NOS, 2017). For decades, gas extraction did not cause problems to the communities living in the gas field area. Some minor earthquakes, most of them not noticeable to humans, occurred in the last two decades (Koster & Van Ommeren, 2015). After 2003, earthquakes started to occur more often. Since 2006, three large earthquakes have occurred, the largest one in Huizinge, in 2012. This earthquake had a magnitude of 3.6 on the Richter magnitude scale (KNMI, 2017). Since this event, consequences of gas extraction in Groningen gained a higher priority in the region, politics and media. The earthquakes that occurred in Groningen are shown in figure 3 and figure 5. Groningen is special, because the earthquakes are not caused by nature but by induced seismicity, a result of human actions. ‘Induced seismicity is earthquake shaking that results from human activity that is beyond the normal regional level of historical seismic activity and that can lead to damage to the surrounding communities’ (Ranke, 2016, p. 82). As such, the consequences of the earthquakes can be blamed on people, not on nature.

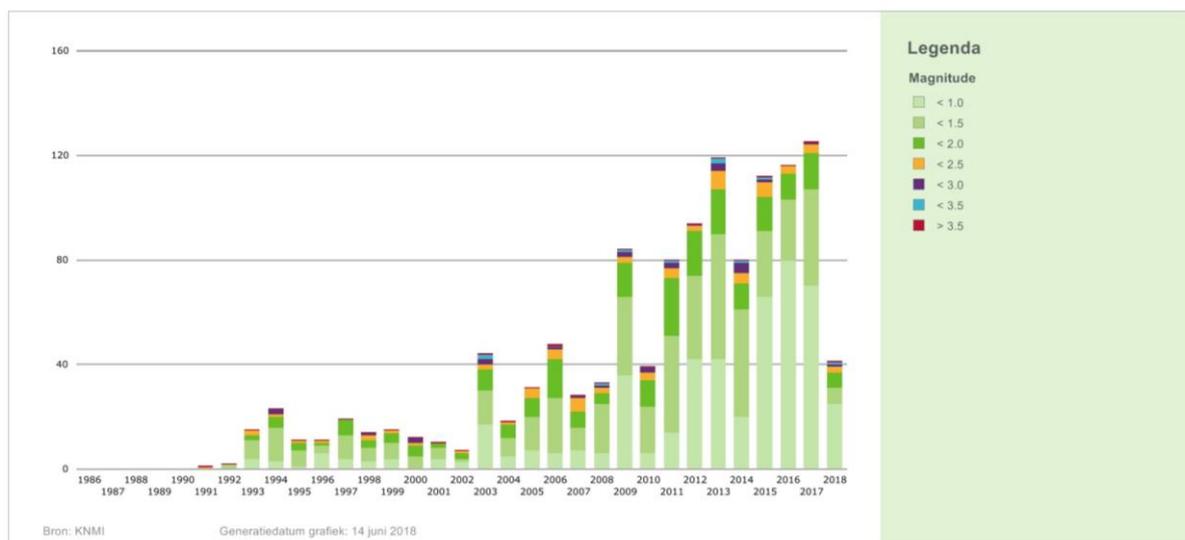


Figure 3. Number of earthquakes that occurred between 1990 – 2018 in the Groningen gas field. Source: NAM (2018).

Due to many events that have been taking place in the Groningen earthquake area, the politics and in Opwierde-Zuid, regarding the earthquakes and the reinforcements programme, a chronological timeline has been made, see figure 4. This timeline is useful to create a clear overview of the current situation in the area.

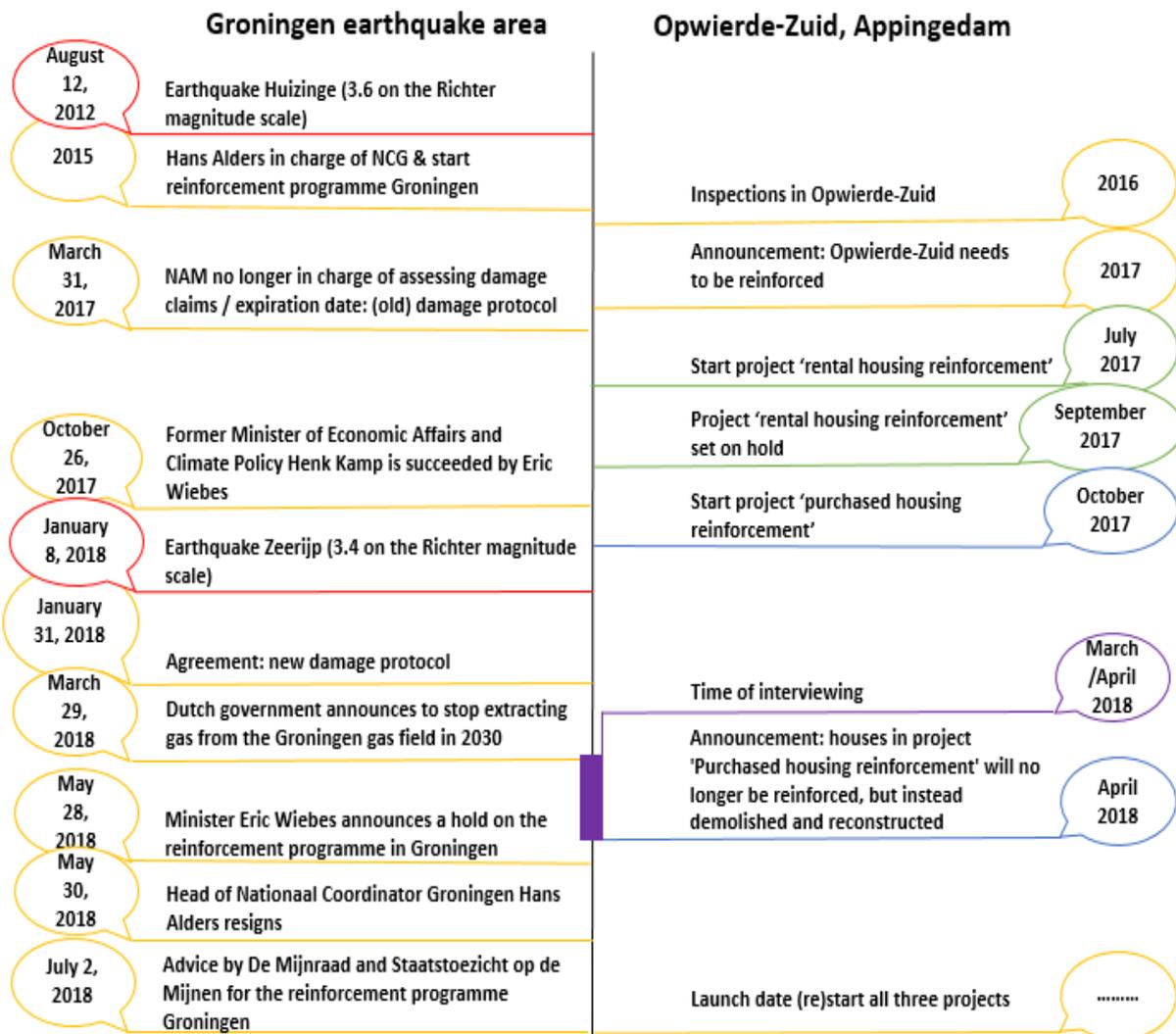


Figure 4. The chronological timeline of the current events in the earthquake area and in Opwierde-Zuid, Appingedam. Sources: Eemskrant (2017); Nationaal Coördinator Groningen (2017); Nationaal Coördinator Groningen (2018); NRC (2017); NRC (2018); Provincie Groningen (2018); Rijksoverheid (2018); RTL Nieuws (2017); RTV Noord (2017).

Over the years, the consequences of the earthquakes have resulted in heated debates between the residents of Groningen, government institutions, especially the national government, and NAM. The inhabitants of Groningen are faced with damage, such as cracks in walls, houses declared uninhabitable and possible effects on housing prices (Duran & Elhorst, 2018; KRO-NCRV, 2017).

Until March 2017, the NAM oversaw damage inspection, assessment and compensation. Centrum Veilig Wonen (CVW), a company that will be discussed in section 3.2, was in charge of assessing these damage claims, commissioned by NAM. As such, NAM was the decision maker in the compensation of the damage they created. This caused much dissatisfaction among the Groningen residents in the earthquake area, due to that they had to negotiate about compensation with the NAM, which felt as an unfair situation (NRC, 2017). From March 2017, NAM took a step back as all parties agreed that the company causing the damage should not be in charge of assessing the damage claims. With the NAM no longer assessing the damage claims, a new damage protocol had to be made. However, this took much longer than expected, and a new damage protocol was finally introduced in January 2018. From March 2018 onwards damage claims are assessed by an independent institution commissioned by the government: Tijdelijke Commissie Mijnbouwschade Groningen (Rijksoverheid, 2018).

On the 29<sup>th</sup> of March, 2018 the Dutch government announced that it will phase out gas extraction at the Groningen gas field by 2030. This means that gas production will be gradually reduced until then. These actions by the Dutch government are necessary to increase the feelings of safety in Groningen in the near future (Rijksoverheid, 2018). Despite this announcement, damage to the houses is increasing and measures need to be taken to increase the safety of the Groningen residents (De Volkskrant, 2018). The Dutch government has launched a reinforcement programme in Groningen. This means that since 2015, about 22.000 houses will be inspected and if necessary reinforced (NOS, 2016). However, new research has been done by De Mijraad and Staatstoezicht op de Mijnen, to indicate to which degree the houses in Groningen will be safer, concerning the phase out on extracting gas. This means that the earthquake risk in the future has been researched. The result of these researches have an effect on the reinforcement programme, as approximately 7.000 houses need to be reinforced at the moment, to meet the safety standard. The Dutch government was waiting for the outcomes of the research, and therefore postponed already planned reinforcements in Groningen for this summer (Nationaal Coördinator Groningen, 2018; Rijksoverheid, 2018). According to available information, the reinforcements in Opwierde-Zuid continue. Opwierde-Zuid in Appingedam is one of the first neighbourhoods where large scale reinforcements occur (NRC, 2017).

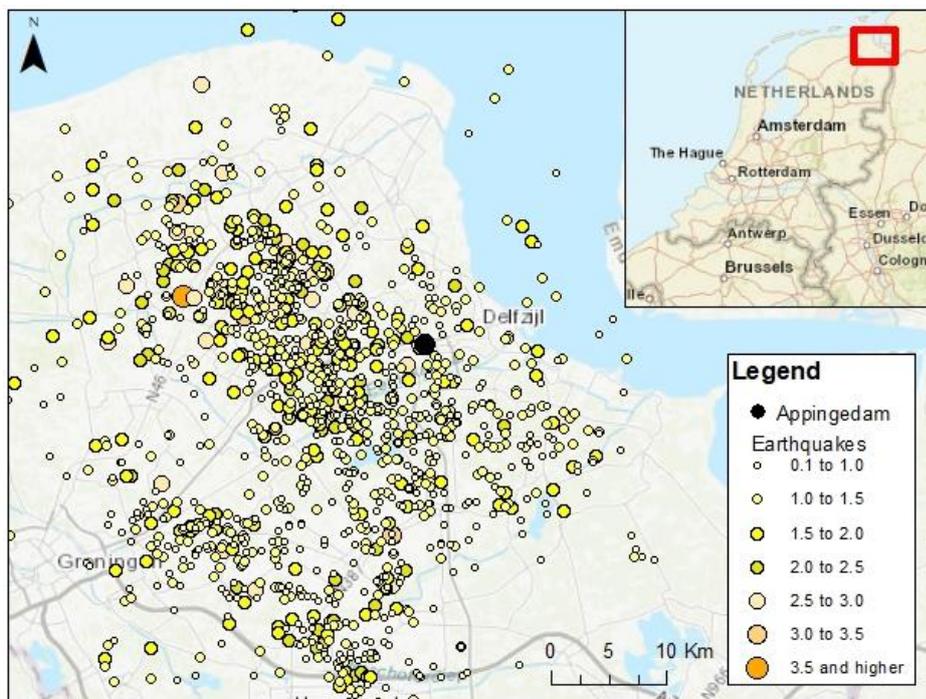


Figure 5. It shows the locations of the earthquakes, which occur mainly in the province of Groningen. It also shows the location of the research: Appingedam. Sources: KNMI (2018); NAM (2018).

### 3.2 Area of interest: Opwierde-Zuid, Appingedam

The town Appingedam is located in the Appingedam municipality in the province of Groningen, the Netherlands. The municipality of Appingedam had approximately 11,971 inhabitants in 2017, of which circa 11,400 live in the town itself (Gemeente Appingedam, 2017). The municipality counts 5600 households (CBS, 2017). Apart from the city of Groningen, Appingedam, established in 1200 a.d, is the only Medieval town in the province. Nowadays, Appingedam is famous for its hanging kitchens above the Damsterdiep. Appingedam presents itself as a town with a high living standard, good educational facilities, good public transport and varied shops (Gemeente Appingedam, 2014).



Figure 6. Opwierde-Zuid is located in the south-east of Appingedam.

### 3.2.1 Opwierde-Zuid project(s)

The research takes place in the Opwierde-Zuid neighbourhood, located in the south-east of Appingedam, which is shown in figure 6. Opwierde-Zuid is a post-war neighbourhood, and counts 398 houses and 64 pilot houses (Nationaal Coördinator Groningen, 2017; Woongroep Marenland, n.d.) The 398 houses can be divided into two types: *Vliesgevelwoningen* (165 houses) and *gemetselde woningen* (233 houses). The two types of houses, including the pilot houses are shown in figure 7. The *vliesgevelwoningen* are all owner-occupied houses. The *gemetselde woningen* count 164 rented houses and 69 owner-occupied houses. The pilot houses are all rented houses (Nationaal Coördinator Groningen, 2017).



Figure 7. Opwierde-Zuid: yellow indicates the *vliesgevelwoningen*, grey indicates the *gemetselde woningen* and blue indicates the pilot houses. Source: Nationaal coordinator Groningen & Gemeente Appingedam (2017).

This research focuses on three types of projects (the project names are created by the researcher to provide a clear structure) :

- Project: ‘rental housing reinforcement’, consists of the 64 pilot rental houses (directed by: Housing corporation Marenland / executive: NAM, Centrum Veilig Wonen, Friso B.V. ). These houses will be thoroughly reinforced and made sustainable, which means new outer walls, isolation, Low emission ++ windows, etcetera (Nationaal Coördinator Groningen, 2017).

Sustainable rental housing is part of a project of 8 Groningen housing corporations to make 1650 rental houses in the province of Groningen sustainable. These 64 rental houses, clustered in 9 blocks, are part of the first set of 150 pilot houses (Duurzaam Gebouwd, 2015). So far, the first three blocks have been reinforced. However, because of the large-scale reinforcement problems and dissatisfaction among all pilot housing residents, the responsible authorities ordered construction work to stop (RTV Noord, 2017). Due to time constraints, Friso B.V. poorly reinforced the houses. Examples of problems experienced by residents are; fluctuating temperature within the houses, high level of noisiness and dry air, which causes headaches and dry mouths (Huurdersvereniging De Maren & Bewonerscommissie Pilotwoningen Opwierde-Zuid, 2018). Until today, this project has already cost more than budgeted, whilst costs are still increasing, due to the suspension of work (RTV Noord, 2017). The exact costs cannot be determined, due to lack of published data.



Figure 8 & 9. Before and after the reinforcement took place of the houses in the 'rental housing reinforcement project'. Source: Author.

- Project: 'Reconstruction', consists of the 233 gemetselde woningen (directed by National Coördinator Groningen and housing corporation Marenland/ executive: Bouwgroep Dijkstra Draisma). During this research the focus within this project will be on the 164 rental houses and not on the owner-occupied houses. These houses are not being reinforced, but instead demolished and reconstructed. This is due to the fact the houses need to be intensively reinforced and therefore newly constructed houses are possibly less expensive. Residents can choose between a family home or a house for all stages of life. A central theme within the reinforcement is sustainability. The exact launch date of this project is not announced yet (see timeline) (Nationaal Coördinator Groningen, 2017).
- Project: 'Purchased housing reinforcement', consists of the 165 owner-occupied vliesgevelwoningen (directed by National Coördinator Groningen / executive: Centrum Veilig wonen). The reinforcement of the first four blocks started in October 2017. The reinforcement measures take place per block. The two houses at the end of the neighbouring block are getting a support construction on the outside and the houses in between are being connected to this support with metal strips. The idea behind this construction is that it will form one solid basis to reinforce the entire housing block at the same time (Nationaal Coördinator Groningen, 2017). However, the vliesgevelwoningen plans have changed while writing this thesis, at the end of April. Due to the rising reinforcement costs and difficulties, the NCG and CVW have decided to stop reinforcing the vliesgevelwoningen, but instead to demolish all the 165 houses and reconstruct them again (DVHN, 2018). The cost of the failed reinforcement was approximately 3.2 billion euros (Emskrant, 2018).



Figure 10 & 11. Houses in the ‘purchased housing reinforcement’ project during and after the reinforcement took place. Source: Author

### 3.2.2 Revitalising plan Opwierde-Zuid

The municipality of Appingedam is revitalising Opwierde-Zuid while the reinforcement project is taking place. The revitalising plan is not part of the reinforcement project, but an opportunity for the municipality to redevelop the environment of this neighbourhood. The neighbourhood is divided into three parts, the east side, the middle area and the west side, which is shown in figure 12. The first revitalising plans for the east and west side have been presented and discussed with the residents. The specific revitalising plans for the middle area of the neighbourhood are not clear yet and will be discussed with the residents as soon as more is known about the reinforcement plans of the project ‘reconstruction’. The revitalising plan consists of several themes: greenery, the water in the neighbourhood, accessibility and housing. This means that there will be more space for greenery, more space for parking and several new ponds. Also, current street pavement is being replaced by new warm-red brick stones. Lastly, some houses are being demolished to make room for newly constructed streets. The reason behind this idea is to increase the accessibility in these living areas (Aedes, 2017; Nationaal Coördinator Groningen, 2017).



Figure 12. The two blue lines show how the neighbourhood is divided into three parts. Source: Gemeente Appingedam (2018).

### 3.3 Actors involved in Opwierde-Zuid

Multiple players are involved in the Opwierde-Zuid reinforcement project. The main ones, discussed in this research are:

- Nederlandse Aardolie Maatschappij (NAM): gas company
- Nederlandse overheid: Dutch government
- National Coördinator Groningen (NCG): Coordinator of the reinforcement programme in Groningen
- Centrum Veilig Wonen (CVW): advice and implementing organisation
- Gemeente Appingedam: municipality
- ASWA-Welzijn Appingedam: social well-being organisation
- Woongroep Marenland: housing corporation
- Opwierde-Zuid residents

The actors will be briefly discussed, to show and indicate their role and ideas behind the reinforcement project. This section will also provide partly the answer on sub question 3. No short overview is presented about the Opwierde-Zuid residents, as they will already be discussed more in depth throughout this research.

#### *NAM*

The Nederlandse Aardolie Maatschappij (NAM) has already been introduced in section 3.1. The company is being held responsible for the earthquakes and is held accountable by the Dutch government for the costs of reinforcements (Nationaal Coördinator Groningen, 2017). However, according to a research of the NOS, in which they retrieved data from the ministry of Economic Affairs and Climate Policy, the Dutch government is also financially contributing to these reinforcements. Until 2017, the Dutch government indirectly paid 750 billion euros for damage claims and reinforcements, this in contrast to the 422 billion euros which the NAM financial contributed (NOS, 2018). The NAM is, besides the Dutch government, also the financier of the reinforcement project in Opwierde-Zuid, but exact costs cannot be determined, due to lack of published data.

#### *Dutch government*

The government is the largest financier of the reinforcement programme in the province of Groningen, and therefore probably also significantly contributing to the reinforcement project in Opwierde-Zuid (NOS, 2018). Furthermore, the current Minister of Economic Affairs and Climate Policy, Eric Wiebes, is in charge of the negotiations with the oil companies Shell and Exxon about the extraction of gas on behalf of the Dutch government (DVHN, 2018). He was also in charge of the negotiations around the newly signed damage protocol earlier this year (Rijksoverheid, 2018).

#### *NCG*

Nationaal Coördinator Groningen (NCG) is a collaboration between the ten municipalities in Groningen in the earthquake area, the province of Groningen and the Dutch government. Until recently (see timeline), Hans Alders oversaw this governmental organisation, which is under the responsibility of the Minister of Economic Affairs and Climate Policy: Eric Wiebes (Nationaal Coördinator Groningen, 2018). Hans Alders was assigned by the government to be in charge of the NCG three years ago. However, Hans Alders resigned recently, due to an intractable conflict with Minister Eric Wiebes on aspects of the reinforcement programme in Groningen (NRC, 2018). The NCG is in charge of the inspection and reinforcement programme in the province of Groningen, including of the reinforcement project in Appingedam. Moreover, increasing the liveability and regional economy of Groningen is also one of the NCG's tasks (Nationaal Coördinator Groningen, 2018).

### *Centrum Veilig Wonen (CVW)*

Centrum Veilig Wonen (CVW) is assigned by NCG to be responsible for the inspection and reinforcing of houses and buildings in the earthquake area. Damage claims reported before the 31<sup>st</sup> of March 2017, covered by the old damage protocol, are settled by CVW. Claims reported after the 31<sup>st</sup> of March 2017 are settled by the Tijdelijke Commissie Mijnbouwschade Groningen, a newly assigned committee (Centrum Veilig Wonen, 2018). Within the reinforcement project, CVW is the executive of both the reinforcement of the ‘purchased housing reinforcement’ project and the ‘rental housing reinforcement project (Nationaal Coördinator Groningen, 2017).

### *Gemeente Appingedam (municipality of Appingedam)*

The municipality of Appingedam is responsible for the public domain and is the competent authority for licenses for the reinforcement in Opwierde-Zuid. It is also coordinating the meetings between different parties during the reinforcement. Moreover, the municipality of Appingedam is responsible for the revitalisation plans for Opwierde-Zuid, which has been explained in context section 3.2. (Aedes Magazine, 2017).

### *ASWA-Welzijn Appingedam*

ASWA-Welzijn is an existing organisation for social wellbeing, that helps to improve the liveability in the municipality of Appingedam. They try to connect people and organisations and stimulate the engagement of residents within their neighbourhood (ASWA-Welzijn Appingedam, 2018). ASWA-Welzijn notices the daily effects of the reinforcement projects in Opwierde-Zuid and is therefore strongly concerned with the well-being of these residents. The social workers of ASWA-Welzijn provide support, such as a listening ear and help with financial and organisational questions, for those in need (ASWA-Welzijn Appingedam, 2017).

### *Woongroep Marenland*

Woongroep Marenland is a housing corporation and has 2500 rental houses, in the municipalities of Delfzijl, Loppersum, Eemsmond and Appingedam (Woongroep Marenland, 2018). Most of the rental houses in Opwierde-Zuid are owned by Woongroep Marenland. Woongroep Marenland made an agreement with NAM to reinforce all the rental houses in Opwierde-Zuid. The ‘rental housing reinforcement’ project is part of this agreement, which was signed in 2015. The NAM ordered CVW to be in charge of this reinforcement and additionally CVW contracted Friso B.V. as the building contractor (Aedes Magazine, 2018). Moreover, Woongroep Marenland contracted bouwgroep Dijkstra Draisma to demolish and reconstruct the houses in the ‘construction’ project, including the rental houses (Eemskrant, 2018). The reinforcement project is also an opportunity for the housing corporation to make all houses in the neighbourhood sustainable.

## 4. Methodology

The following section describes the methodology used in this research. This section contains the research method, data collection and the technicalities of the research. It will also focus on ethical considerations, as these are important in addressing the possibly sensitive research topic for the Groningen residents.

### 4.1 Research Method

This research uses a qualitative research method to explore the social impacts of the reinforcement projects on the residents of Opwierde-Zuid. Qualitative methods explore the subjective meanings, values and emotions of people (Clifford et al., 2010). They can give a deeper understanding of people's perceptions. Moreover, by using a qualitative method, one can get more insight in the different viewpoints and experiences of people about a certain topic. Qualitative research has the focus on the individual or a small group of people, this is also called an intensive research approach. Intensive research means that a single or a small number of case studies are being extensively researched. This creates a large amount of detailed data of the case(s) (Winchester & Rofo, 2016).

We are searching for meanings, perceptions, feelings, emotions and experiences of Opwierde-Zuid residents rather than exact numbers and figures. The personal stories of the residents can give a deeper and richer understanding of the social impacts that residents experience. Therefore, we have chosen for a qualitative research design instead of a quantitative research design.

### 4.2 Semi-structured interviews and on-site observations

The qualitative method used in this research is that of semi-structured interviews. Semi-structured interviews are interviews that are prepared with a predetermined list of questions. However, the interviewees and interviewer have the flexibility to explore and address issues they think are relevant or explicitly important (Longhurst, 2010; Hennink et al., 2011). During the interview, the researcher attempts to acquire information from the interviewee by discussing a topic in depth (Longhurst, 2010).

Furthermore, during the months of interviewing, on-site observations took place in Opwierde-Zuid. One of the purposes of doing observations is to provide complementary evidence for the research. Moreover, by observing the environment, the researcher is better able to capture and understand the context in which the research is taking place. In this way, the researcher can reflect on the understanding of the experiences and perceptions of the participants (Kearns, 2016).

#### 4.2.1 Interview content and structure

Veal (2017) mentions three main characteristics of semi-structured interviews: length, depth and structure. The length of these interviews is at least half an hour. Furthermore, semi-structured interviews try to explore a topic more in depth in contrast to questionnaire-based interviews. During an interview, the researcher tries to encourage the interviewee to talk and asks follow-up questions to get a broader understanding of their answers. Lastly, a semi-structured interview has less structure than a questionnaire-based interview, which means that every interview is different and therefore unique.

The interviews took place in the private homes of the participants and they were generally conducted in the same structure. Before the interview started, the researcher briefly explained the content of the research, and the participants were asked if they had any objections against recording the interview, which was never the case. This was asked before the recording started and is therefore not included in the transcript. The researcher wanted to make sure that the participants gave permission before the recording started. The participants were also informed of the purpose and goals of the research, as

the data will not only be used for this master thesis, but also sent to other authorities who are interested and possibly using the outcomes of the research. Therefore, it was important to address the issue of anonymity with the participant. Interviews can be experienced as less anonymous than questionnaires, as the researcher spends more time with participants and obtains deep knowledge and insight of a participant related to the topic (Dowling, 2016). Although several participants indicated that they do not mind their names being mentioned, the researcher has nonetheless chosen to change their names to pseudonyms. Moreover, the participants' age and length of residency are grouped in categories. This is done to secure the sensitive information that participants shared during the interviews. The researcher also wants to avoid any possible harm done towards the participants. The first letter of the name was kept, to create a new pseudo name. The researcher also tried to choose a name which fitted the participants' personalities. By doing this, the researcher tried to communicate the results in the most meaningful way possible, instead of merely numbering the participants.

Before and during the introduction questions, some background information on the residents was obtained. The interviews consisted of six different topics, which were all related to the research question and literature. The interviews were held in a pyramid structured way (Dunn, 2016), meaning that the interview started with broad and more general questions about the sort of housing and project. As the interview proceeded, the questions became more in-depth and personal. During the second set of questions, information was asked about the resident's house, partially related to the project. This continued in the third set of questions as the (change in) sense of home was being discussed. The interview then continued with a section on the earthquake matter, followed by a set of questions on the impact of the reinforcement and the revitalising plan on the neighbourhood. The last set of questions existed of questions about the project itself and the actions of the different actors. To finish off the interview, the participant was asked how he/she felt after discussing this topic. In this way the researcher gained more information about the emotions of the participants, and their state of mind. Most interviews were held in a less structured way than described above and as shown in the interview guide, as most of the participants were addressing many of the questions already during the interview.

#### 4.2.2 Recruitment of participants

On the 7<sup>th</sup> of March, a network meeting for social welfare organizations active in the North of the Netherlands was organised by ASWA Welzijn in Appingedam. The researcher was invited to join this event by one of the members of the organization. During the meeting, a tour through the neighbourhood Opwierde-Zuid was organised by one of its residents. This tour provided a brief introduction of the different projects taking place in Opwierde-Zuid. It also functioned as an introduction to the neighbourhood in general. Moreover, observations and notes were taken by the researcher, which were useful for creating a context about the neighbourhood for this research.

Furthermore, during the network meeting, Professor Tom Postmes from the Faculty of Behavioural and Social Science of the University of Groningen, presented his research on the consequences of the earthquakes, especially in the field of feelings on safety and health, experienced by the residents of Groningen. Postmes' research is used in the introduction section of this research to present a brief overview of the scale of the problems in the Groningen earthquake area.

So far, the reinforcement project has caused quite some commotion within the Opwierde-Zuid community. Additionally, Opwierde-Zuid has already received much media attention, as well as attention from (governmental) institutions, since the reinforcement project was launched. Due to the media attention that both the earthquake matter and the reinforcement are getting, we have chosen to recruit participants based on snowball sampling (Stratford & Bradshaw, 2016).

To answer the research question, interviews were conducted with residents of Opwierde-Zuid. Participants were selected based on two criteria. Firstly, the participants need to have a permanent residential address in one of the three selected projects ('rental housing reinforcement', 'purchased housing reinforcement' and 'reconstruction') within Opwierde-Zuid. Secondly, they need to have lived in Opwierde-Zuid since before the inspections took place in 2016. In this way, participants have experienced the situation before, and during the reinforcement project up to its current state.

The resident leading the tour during the network meeting became one of the first participants in this research, as well as a contact person for several other potential participants. The first participant asked several acquaintances in the neighbourhood if they were also willing to participate in this research. If someone was open for an interview, their contact information was sent to the researcher. In addition, some of the new participants also recruited acquaintances in the neighbourhood for this research. Moreover, one of the participants was introduced via an acquaintance of the researcher.

Snowball sampling has its advantages and disadvantages. Several contacts within the neighbourhood advised not to go door-by-door, but instead use their contacts to recruit new participants. This is due to some residents being tired of the ongoing discussion and attention of their neighbourhood and therefore do not want to be approached by outsiders. However, snowball sampling also has its disadvantages, as non-acquaintances of the participants had no chance to be selected. Moreover, the group of people who did not want to share their experience is also not included in the research. Despite this, a diverse group of participants has been recruited. The group of participants included active members of committees, which are related to the reinforcement project, but also residents who are less active. Moreover, the total estimated number of inhabitants in Opwierde-Zuid is 1240, of which 600 female and 640 male (CBS, 2012). Females and males are also in this research equally represented, which is shown in table 2. Table 1 shows the age distribution in Opwierde-Zuid, compared to the age distribution in the Netherlands. Despite aiming for participants from different age groups, most participants belong to the 45-64 and 65 and older groups. However, as shown in table 2, the participants ages range from 35 to 74 years old, which still creates a diverse age distribution.

Age	Percentage Opwierde-Zuid	Percentage Netherlands
< 14	20 %	16 %
14-24	14 %	12 %
25-44	27 %	27 %
45-64	31 %	29 %
65 >	8 %	16 %

Table 1. Overview of the age distribution in Opwierde-Zuid in 2010. The numbers are estimated, due to the rounding off numbers in the CBS database. Source: CBS (2012).

So far, only a small group of houses have been reinforced. Therefore, the decision was made to only interview residents whose houses are not being reinforced or reconstructed yet. In this way, the participants were in the same stage of the project, which made the data of each interview easier and more meaningful to compare. Additionally, this group of residents was larger, which made it easier to find participants. The downside to excluding the group living in reinforced houses, is that their experiences could not be taken into account in this research.

A total of nine interviews, of which 5 couples and 4 individuals, have been conducted in March and April 2018. The interviews had a duration between 30 and 90 minutes. The characteristics of the participants are shown in table 2. Although only three interviews with participants of each project ('reconstructions', 'rental housing reinforcements' and 'purchased housing reinforcements') have been conducted, the amount and detailed information that the participants provided have shown a clear overview of the social impacts on the lives of the residents in this neighbourhood. More

interviews might have provided a larger set of data about the experiences of residents, however due to time constraints the researcher has chosen not to conduct more interviews.

Participant	Age group	Household	Length of residency	Homeowner /tenant	Project	Date of interview
Geert & Ingrid	70-74 (both)	Elderly couple	40-49 years	Tenant	'reconstruction'	March 20, 2018
Mark	55-59	Family with an adult child (living at home)	10-19 years	Tenant	'rental housing reinforcement'	March 20, 2018
Erik	45-49	Family with two young children	10-19 years	Homeowner	'purchased housing reinforcement'	April 5, 2018
Joost & Sylvia	45-49/ 35-39	Family with an adult child (living at home)	0-9 years	Tenant	'reconstruction'	April 10, 2018
Niels & Deborah	50-54/ 45-49	Family with two adult children (both living at home)	20-29 years	Tenant	'rental housing reinforcement'	April 12, 2018
Hugo & Thea	70-74 (both)	Elderly couple	40-49 years	Tenant	'rental housing reinforcement'	April 13, 2018
Jeske	65-69	Single	20-29 years	Tenant	'reconstruction'	April 16, 2018
Tjeerd & Linda	55-59 (both)	Couple	30-39 years	Homeowner	'purchased housing reinforcement'	April 19, 2018
Noortje	50-54	Single	20-29 years	Homeowner	'purchased housing reinforcements'	April 26, 2018

Table 2. Characteristics participants.

On the evening before the interview with the last participant within this research took place, the changes in the reinforcement plan of the 'purchased housing reinforcement' project were announced to the homeowners. The interviews with the other two homeowners were based on the former housing plans, in which the researcher has decided to also mainly focus on Noortje's experience on this. In this way the experiences of the homeowners were related to the same housing plans. Therefore, the former housing plans of the 'purchased housing reinforcement' project is described in the results as the current housing plans, as it was still current at the time of the other two interviews.

The participants did not sign any consent form. The researcher did not find it necessary to conduct this, as participants were recruited based on snowball sampling. The participants knew beforehand that they were participating in a research, by means of an interview. They agreed that the interview was recorded and that their experiences were used for research.

### 4.3 Data analyses

The first step after interviewing was to transcribe the interviews. The interviews have been transcribed in Dutch, to allow the researcher to interpret the data correctly. Afterwards, the raw data had to be

transformed into meaningful information. Making sense of the data can be done through the technique of coding (Saldaña, 2013). The ATLAS.ti tool is used for coding the data. However, due to the emotional content of the data, the transcripts were also analysed by hand, as this allows to put them in context.

Both the directed content and the thematic approach are used to analyse the data. The directed content approach means that codes are derived from the literature. These codes are mainly defined before and during the data analysis (Hsieh & Shannon, 2005). Before coding the data, a list of codes was made based on the theoretical framework. This way of coding is also known as deductive coding (Saldaña, 2013). Examples of deductive codes are: meaning of home, safety towards house and loss in asset value. Thematic approach can also help analysing and identifying different patterns and themes within data. It can also be a useful way of analysing similarities and differences in participants' perspectives, as well as 'generating unanticipated insights' (Braun & Clarke, 2006; Nowell et al., 2017). In this way, some of the codes are based on inductive coding. Examples of inductive codes are: compensation for residents, communication with institutions and postponement of renewal or conservation.

The next step was to group the codes into themes. The themes were selected based on their recurrent pattern within the data. Eventually, 6 themes have been selected and they will be presented in the results section. Moreover, the observational data was linked to the interview data, which provided a complementary insight to the data in general. Lastly, quotes were selected that were most adequate for telling the story of the data. The quotes are translated into English, as this thesis is written in this language. However, this has also its downside, as not every sentence or word can be translated as it will lose its meaning. Therefore we have chosen not to translate some of the sentences from Dutch to English.

#### 4.4 Sensitivity of the topic

The main ethical issue in this research is the sensitivity of the topic. Debates regarding the earthquakes in Groningen have become more heated nowadays, since residents and organisations have become more discontent with the situation over time. The earthquakes issues have already caused an overflow of emotions among the Groningen residents (CMO STAMM & Sociaal Planbureau Groningen, 2016; Postmes et al., 2018). It is possible that the interviewer has asked questions that might have upset the participants in one way or another. To minimize the harm, the participants were informed beforehand. This means that the participants knew what the research was about, the issues that were being explored during the interview and what the researcher was expecting of them (Dowling, 2016). In this case the participants were partially prepared for the possible emotional topics that could be discussed during the interview. However, many participants remained very emotional while explaining their experiences concerning, among others, the project. They showed emotions such as frustration, anger, sadness and sometimes physiological impacts were also discussed. Due to the concern about the respondents' distress, the interview incorporated a final question about the participants' state of mind. The researcher wanted to make sure that the participants were not left behind too emotionally after the interview. The reactions on this question were largely the same. It satisfied the participants, that they had the chance to share their story and help the researcher at the same time. They also thought it was important to address their experiences towards the outside world.

All the interviews took place in the private homes of the participants, a debatable location considering the research question. The concept of 'home' was central in the interviews, which might have had advantages as well as disadvantages. Firstly, the participants were directly confronted with the issues related to their house, which might have upset them more. On the other hand, they could show the researcher their house, which was helpful to address issues when it comes to damage to the house,

changes done due to the reinforcement project in the neighbourhood or other relevant information related to the discussion. In this case, conducting the interviews at the reinforcement project location itself was most logical and afterwards seemed the right choice. In this way, the conducted data can be placed into context, which is of relevance in this case.

## 5. Results

This section presents the results collected from the interviews. The data has been divided into themes, which will be outlined in this section. However, it is important to keep in mind that all the themes are related to each other. The overall experience of a participant cannot be bound by one theme, but is a mixture of all themes together. Thus, the experience of a participant described in one theme might have had influence on the participant's experience described in another one. This will be discussed more in depth in the last theme of this section, 'overall experience'. As already mentioned in the methodology, some topics, or the entire experience of a participant, have a highly emotional meaning. The emotions of the participants are linked to the themes, to keep the emotions into context, but will also be more fully described in the theme 'psychological and emotional impacts'. Most of the themes are further divided into several topics, to provide a clear overview. To present the social impacts of Opwierde-Zuid in a more meaningful and logical way, the first theme addresses the residents' experience with the housing and neighbourhood plans. The following themes will address the social impacts on a more personal level, such as on a change in sense of home and emotional and health problems. This is also according to the guideline we use of Vanclay (2003), where social impact to the living environment is first described (how people live and their environment), which is followed by more personal aspects (such as, people's health and wellbeing and their fears and aspirations)

### 5.1 Housing and neighbourhood plans

#### 5.1.1 Housing plans

The three different housing projects ('rental housing reinforcement', 'reconstruction' and 'purchased housing reinforcement') were all explained in section 3.2. The three housing projects differ from each other. This has resulted in different experiences among the participants between the three housing projects.

There is a clear difference between the participants in their satisfaction towards their current housing and the neighbourhood plans. The six participants from the 'purchased housing reinforcements' and 'rental housing reinforcements' have a largely negative view on their current housing plans, opposed to the three participants from the 'reconstruction' project, who have a more positive opinion towards their current housing plans. This is due to several reasons, which will be outlined throughout this paragraph.

##### *5.1.1.1 Reconstruction project plans*

Within the project 'reconstruction', residents could choose between a newly constructed family home or a house for all stages of life. A house for all stages of life, means that the house is customised to different age groups by for example grab bars in the bathroom, or includes a downstairs bedroom. Both the elderly couple Geert (70-74) & Ingrid (70-74), and Jeske (65-69) have decided to choose a house for all stages of life. Especially in their stage of life, having a bedroom downstairs, gives them the opportunity to remain living at the same place. They are both positive towards the idea that the houses will be made sustainable. Joost (45-49) & Sylvia (35-39), the other couple in the 'reconstruction' project are also supporting this idea. Joost (45-49) & Sylvia (35-39) have chosen a family home, because their son is still living with them. Despite all having a positive opinion about their future house, the fact that the plans about the 'construction' project are still relatively unclear, creates an insecure feeling among the participants. These three participants are in favour of the reinforcement project, if the

standards for the houses are acceptable. This means that the newly built houses need to encourage improvements in their current situation of living and discourage worsening of any situation.

The participants in the projects 'rental housing reinforcement' and 'purchased housing reinforcement' all agree on the fact that they rather see their houses being demolished and reconstructed, than being reinforced. This is due to several reasons. To explain this in a more clear and transparent way, the two projects will be discussed separately.

#### *5.1.1.2 Rental housing reinforcement project plans*

As explained in context section 3.2. the 'rental housing reinforcements' project is set on hold since September. All participants are dissatisfied with how the reinforcement was done at the first three blocks. Therefore, they signed the petition to stop the project, because they do not want to face the same problems as their neighbours currently do. Every participant in this project comprehensively discussed the problems that occur at the first three blocks during the interview. Niels (50-54) & Deborah (45-49) indicate:

*"Well, because they kept the furniture in the house and there was no care taking plan. They said that they had a care taking plan, and they said that everything would be taken care of for the residents. And eventually they did not arrange anything for the residents. And the finishing of the panels, of the outside panels was bad. The finishing on the inside of the house was really bad. Finally, we said, we do not agree with this, because we want to come back into a decent house"* (Niels, 50-54 & Deborah, 45-49).

Several more problems indicated by the participants are; damage inside the house due to reinforcement, cheap finishing, which means that the residents have to paint their walls again and there is too much space left between the baseboards and floor.

The residents want to discuss the further process first with all parties and are now working on a list of demands. *"I expect a list of demands towards the housing corporation and if they meet these demands, then we will agree with the reinforcement, zero meter, making the houses sustainable. But under strict conditions"* (Mark, 55-59).

The 'rental housing reinforcement' project should, according to the participants, improve their situation of living, instead of making it worse, which is currently the case with their housing plans.

#### *5.1.1.3 Purchased housing reinforcement project plans*

The participants of the 'purchased housing reinforcement' project are also strongly against their housing plans. Until today, they refuse to co-operate with the current housing plans. This is due to the following reasons:

According to these participants, their housing plans are based on assumptions. The authorities in charge of reinforcing the houses are constantly changing the plans, which makes it difficult for the residents to have trust in the implementation of the reinforcement. Safety is an often mentioned argument why the participants are in favour of the reinforcement. A home should function as a safe place for people (Fonad et al., 2006). However, because the reinforcement is based on assumptions, safety has become highly debatable. According to the participants, their houses are not being built entirely earthquake resistant, but instead receive minimal reinforcements (near collapse), which means that their house still can collapse if a large earthquake occurs.

*"It is a tricky business, these are all assumptions. And in the worst case, if an earthquake of 5 occurs, then all these houses are total loss anyway. Then they will be torn down anyway and new houses will have to be build. So, there is no future perspective. So, you have three safety levels (...) Everything will be built 'near collapse', which means it cannot collapse just yet, but there cannot be an aftershock,*

*because then the whole house will collapse. That chance exists. And that is where it is all based on. So, on a minimum safety norm and on multiple assumptions. And that makes it just wrong” (Erik, 45-49).*

The three participants all want a safer house, but with the current housing plans, their sense of safety (Harris et al., 1995) will not increase.

Moreover, sustainability is a large theme within both the ‘construction’ and ‘rental housing reinforcement’ project. But, in the ‘purchased housing reinforcement’ project sustainability remains highly a secondary theme. Especially in Groningen, where green energy is a most welcomed alternative for gas, participants think it is important that their houses are being made sustainable and ready for the future, especially now when gas extraction will gradually be reduced. They see this reinforcement project as the opportunity for the government to start making progress with their policy of more sustainable housing. The participants of the ‘purchased housing reinforcement’ project experience the minimum sustainability that their houses will receive as unfair, compared to the rest of the neighbourhood. After pressure from these homeowners, a 7.000 euro per household is provided to spend on solar panels or other sustainability equipment. Although, the 7000 euro is more than welcome, it is still not enough to make their houses sustainable. It therefore remains an issue in this reinforcement project.

Lastly, besides safety and sustainability, economic perspective is also a large criticized aspect within the ‘purchased housing reinforcement’ project. *“Three things: safety, sustainability and economic perspective. And the latter one is also very important for us. Because our economic perspective is a long way off” (Erik, 45-49).* Among the homeowners participants, the uncertainty about the asset value of their houses is high. They see both the chances of earthquakes in the region and the consequences of these earthquakes, among others damage to the homes, as the main cause for the loss in asset value. This relates to Lindell & Prater (2003), who conclude that the loss in asset value and costs of renovation, due to property damage can have a high financial impact on residents. The reinforcement project makes the matter worse, as homeowners see the rest of the neighbourhood being demolished and reconstructed, but their houses will remain partially the same and are being reinforced with minimal safety and sustainability. De Kam & May (2017) and Duran & Elhorst, (2018), already concluded that homeowners in the earthquake region in Groningen have more difficulties in selling their houses, due to the region’s reputation. This huge contrast between their houses (post-war style) and the rest of the neighbourhood in the future (newly constructed houses) is frustrating and can make it even more difficult for the participants to sell their house in the future. One participant explained this in a very emotional way:

*“How large do you want the contrast to be? I want to emphasize that we are definitely not jealous. I do not begrudge my neighbours anything. However, the feeling experienced when we left and not only by us, but among most of the vliesgevelwoningen was that... Yes what the hell, everything around us. Because if you look in that direction, everything will be demolished. Everything that is on this side, will remain. So I will be surrounded with new houses and I will never be able to sell mine again” (Erik, 45-49).*

The amount of money that is spent by the government and NAM on the reinforcement of the ‘purchased housing reinforcement’ and the ‘rental housing reinforcement’, is highly criticized by all participants. Until today, these two projects have cost a large amount of money, as discussed in section 3.2. The participants do not understand why the authorities spend that much money on these houses. Demolishing and reconstruction is according to the participants much cheaper and can, at the same time, be done in a more effective way, with less assumptions and problems. The authorities in charge of the ‘purchased housing reinforcement’ made the decision to change their plans. Noortje (50-54), seemed very relieved in her interview, regarding these changes in plans. She indicates that she sees

more opportunities, concerning sustainability, safety and asset value with a newly reconstructed house, opposed to the former reinforcement plans.

The authorities of the 'rental housing reinforcement' project still have the intention to reinforce these houses, with great displeasure among all 'rental housing reinforcement' residents. *"This is, this is going on since 2015. That is how long this is already going on. Apparently, that is how the contract is being signed with the NAM. So this has to proceed. (...)"* (Hugo, 70-74 & Thea, 70-74).

#### 5.1.2 Neighbourhood revitalising plans

The neighbourhood revitalising plans have been discussed in section 3.2. Overall, the revitalising plans of the municipality have been positively received by the participants. Especially, the plans for better accessibility and parking spaces are largely welcomed. According to the participants, the lack of these two aspects in the neighbourhood are the main issues when it comes to neighbourhood annoyance. Two of the participants, now living in the less accessible area, do think that increasing accessibility in the neighbourhood is necessary. However, they are not looking forward to the fact that a new street will be built in front of their house. Niels (50-54) & Deborah (45-49) explain the downside and the opportunity of the newly built street for them:

*"The only downside to this is.. we have grass in front of our house. Well, containers are now placed on it, but there was always grass, so we never had any traffic here in front of the house. But soon, we will get a street built in front of the house. Where the containers are located, that will be a street. There will also be a house demolished over there. One of the four houses in that neighbouring block, will be demolished, because the street will be built at that location. Partially, because of the fire-brigade and emergency services and so.. because no fire-brigade can reach this area. The ambulance not, so that will be improved"* (Niels, 50-54 & Deborah, 45-49).

The plans about the newly built ponds are not positively received by everyone. Some participants do not think it is necessary to invest in this, others see it as an opportunity to make the neighbourhood more attractive. The majority of the participants see the revitalising plans as the opportunity to modernise the neighbourhood, which is according to them necessary to adjust to the time we are living in and the demand for different housing and attractive neighbourhoods.

*"Yes of course, if it always remains the same. Something has to change a little. To modernise it a little. How do they call that? Adjust to the time you are living in. And this neighbourhood has been built here 45 years ago"* (Niels, 50-54 & Deborah, 45-49).

This relates to the theory of Bolt et al., (2011) who indicate that the revitalisation of neighbourhoods can create opportunities to improving public spaces, increasing quality of houses and create more attractive neighbourhoods.

However, not everyone thinks that the municipality is acting progressively enough when it comes to modernising the neighbourhood. Erik (45-49), a participant from the 'purchased housing reinforcement' project, thinks that the municipality has to demolish all the houses and reconstruct an entire new modern neighbourhood. Also, Geert (70-74) & Ingrid (70-74), were hoping for a more modern neighbourhood with different houses. They especially hoped for a semi-detached house, instead of another house in a row.

According to almost all participants, revitalising the neighbourhood also has its downside. The idea that another large-scale project will be taking place in the neighbourhood, separate from the reinforcement project, makes the situation less attractive. The participants experience the revitalising plans as an inconvenience and the idea that they will be living in a construction site for a long period

of time, is largely experienced as an extra distress in the whole reinforcement project. Golmohammadi et al., (2013) and Xue et al., (2015) argue that construction work can cause much annoyance to residents, such as noise annoyance and damage to roads. Although, these annoyances are already experienced by some of the participants regarding the reinforcement. Many other participants are also concerned that this will affect them in the future and that this will decrease their enjoyment of residence.

*“A downside to this is that it has to be done all in once. It is a large operation. In total circa 400 houses are being demolished and have to be rebuilt. I’m not looking forward to that. The fear that is among us, despite that we are living in a quiet area, is that we will be living in a construction site the next 5 till probably 10 years. We dread this will happen”* (Mark, 55-59).

### 5.1.3 Temporary relocation

During the reinforcement, participants are being relocated to temporary housing for several months. The exact length and time of the relocation for all three housing projects was not announced yet during the time of interviewing. According to the participants, these temporary accommodations are modern and properly decorated and are seen as a good temporary alternative, comparable to their current housing. All participants think it is important that their houses are being reinforced and therefore they agree that it is necessary to be relocated to a temporary accommodation. However, most of the participants do not look forward to this moment. They are uncertain where they will end up, which neighbours they will have living next to them, and which furniture and belongings they have to bring. Two participants dislike the idea that they cannot practice their hobbies in this time period. Mark (55-59) explain this as follow:

*“Mm, yes, very annoying. Because we have to leave our house probably for 6-8 months. Because they need to thoroughly reinforce the place. That means that I, that we have to limit our activities in the house. And that I cannot use my music studio, which is in the attic, for 8 months. So, that means that I cannot practice my hobbies in those months. (...) Dat is toch voor mij echt een dingetje (...)”* (Mark, 55-59).

Proshansky et al., (1983) and Carroll et al., (2009) concluded that people’s daily routines are mostly performed in physical environments, such as a house. When a house changes, or in this case when residents are relocated to a different house, people can experience an interruption in their daily routines. This is due to that people cannot perform their daily routines as they are used to.

A couple of the participants dislike the idea that their furniture will be in storage. The main concern regarding the furniture is possible damage caused by moving it. They indicate that they will take their most valued belongings with them to the temporary accommodation, in case something will happen with their stuff.

*“All your furniture has to be stored. How do they store all my furniture? In what state do I get my stuff back? These are all things that we worry about”* (Mark, 55-59).

Carroll et al., (2009) explain that people attach value to their personal belongings and decorate their homes according to their personal taste. Therefore, loss of or damage to these personal belongings cannot always be replaced.

There is one couple, Niels (50-54) & Deborah (45-49), who requested a different housing accommodation via the housing corporation. It seems that the Wi-Fi connection in the temporary accommodation is less strong than in their current housing. Their two sons use the internet frequently. This means that they cannot practice their activities if they will be staying in a temporary

accommodation. Therefore, they made the decision to request a different housing accommodation somewhere in the town Appingedam. A downside to this is, that they have no idea where they will end up in town Appingedam, which creates a feeling of uncertainty. They also mentioned that without access to internet, the relationship with their sons can be set under pressure. This can be linked to the research of Carroll et al., (2009) who conclude that, when people cannot perform their daily routines as adequately as they are used to in the temporary accommodation, this can put relationships, for example between families, under huge pressure.

Hugo (70-74) & Thea (70-74) requested for a family home instead of an elderly accommodation, because two of their grandchildren regularly stay over. Therefore, they need an extra bedroom, which the elderly accommodation does not provide. However, last September they noticed that the housing corporation had given them an elderly accommodation, instead of the promised family home. They felt highly deceived by the housing corporation. Moreover, when they finally agreed to move into the elderly home, the housing project was set on hold. With all their belongings already packed into moving boxes and ready to go, they felt cheated for the second time in a short period of time. The event that Hugo (70-74) & Thea (70-74) describe here, shows a clear decrease in trust in the housing corporation.

## 5.2 Sense of home and place attachment

The meaning of home is slightly different per participant. All participants associate home with their actual dwelling. This relates to the theory of Lewicka (2011), who concludes that most people do so. 7 out of 9 participants indicate that they experience a strong connection to their homes. Home means everything to them. Parsell (2012) already concluded that people's home is much respected and that home can mean a lot to people on the social, emotional and material levels in life. The participants' home symbolizes a place of safety, a place to pull back, a place of security, rootedness, or a place to relax. These meanings of home are also mentioned in the research of Case (1996), Lewicka (2011), Moore (2000) and Falk et al., (2012). They concluded that home can symbolize among others, 'a private and safe environment for people to withdraw', a comfortable place, security and a place of safety'. Some of the participants in this research indicate that they have invested time, money and effort to make their house a home. This can be linked to the research of Carroll et al., (2009), in which they emphasize that people invest much of themselves, emotionally, personally and financially into a house. This is not only pointed out by the homeowners within this research, but also tenants have tried to turn their house into a home.

*"We have been living here for 45 years, we have experienced good and bad times here, and we built everything here from scratch. It was a barren plain when we came here. There was nothing, so we had to do everything ourselves. A lot has happened in these 45 years"* (Geert, 70-74 & Ingrid, 70-74).

The three couples that have been living in the neighbourhood the longest, experience nostalgic feelings towards their home. The other participants did not mention anything about nostalgic feelings in their interview. The three couples especially indicate that their home is important, because they have memories of their children growing up in this place. *"This place means everything. Our children were born here, .. I do not know. We experienced good and bad times here. So yeah, our place is definitely sacred"* (Geert, 70-74 & Ingrid, 70-74).

The outcome of this result can be linked to the research of Zwiers et al., (2016) who indicate that residents who live longer in a certain place, also can experience more nostalgic feelings to that place. Zwiers et al., (2016) also indicate that these residents are more willing to protect their actual living environment and have therefore probably more difficulties to adapt to changes. However, in this

research several participants, with different lengths of residency, pointed out that they have difficulties in adapting to the changes that occur in Opwierde-Zuid. Thus, this result is in contrast to what Zwiers et al., (2016) indicate.

It seems that these three couples already show a sense of loss and nostalgic feelings towards their homes, which can be defined, according to Kleinhans (2005) as 'affliction'. The participants indicate that they feel highly attached to their home. Kleinhans (2005) & Fried (1963) explain: the more attached people are towards their home, the more they bond with it, and the stronger the possibility that affliction will occur when people have to leave this place. Moreover, Carroll et al., (2003) explained that replacing a damaged home, can break the bond between the past and present. These three participants experience the reinforcement as a breaking of bond between their current housing and their future reinforced house.

During the interview, participants were asked if they feel attached towards their home and towards the town Appingedam. The three couples, discussed above, also indicate that they feel strongly attached to their homes, and to the town Appingedam. However, Hugo (70-74) & Thea (70-74) are open for moving to a house for all stages of life within the town Appingedam, because of their age. Moreover, the other four participants who experience a strong connection towards their home, are all largely attached to Appingedam.

Two participants, both tenants, indicate that they do not experience a strong connection towards their home. One of them, Mark (55-59), also experiences a low attachment towards the town Appingedam, and has no objections to moving somewhere else. Another participant couple, Niels (50-54) & Deborah (45-49), experience a relative low attachment towards their home, but would like to stay living within Appingedam. In general, the participant did not indicate an exact reason why they experience a less stronger connection towards their home than the others. However, Mark did mention that his house is mainly just a rental to him. He also indicates that he does not get easily attached to a house in general. Niels & Deborah stated that their house is a place of living, a home, but that they do not attach high value to it as they can easily live somewhere else should they want to.

### 5.2.1 Housing satisfaction and damage to homes

Most of the participants are satisfied with their current housing. However, damage to their homes caused by earthquakes, are mentioned frequently as an aspect that decreases their level of housing satisfaction. Especially when it relates to their feelings of unsafety. Two homeowners are faced with a damaged house due to the earthquakes and experience feelings of unsafety. As a result, their housing satisfaction has also decreased, because their home should function as their place of safety, which is currently not the case. *"If my house was safe... I'm very satisfied with my house. However, it is not safe and the house is largely damaged (...). That's the point"* (Tjeerd, 55-59 & Linda, 55-59). All the 'purchased housing reinforcement' project participants indicate that they want to live in a safer house and that this reinforcement should provide this. However, which has already been discussed before, the idea that the houses are being built according to a near collapse construction, will not increase their sense of safety.

The majority of the participants are faced with cracks in their walls, while only two participants mentioned that their home is not being damaged by the earthquakes. Despite that most participants live in a damaged home, many of them do not experience any feelings of unsafety. Although Tapstell & Tunstall (2008) pointed out that a disaster can lead to unsecure feelings towards the environment as a place to live, many participants indicate that they still see Opwierde-Zuid as a safe place to live, despite the risk of earthquakes and damage to their homes. This is as mentioned above not the case for every participant, as some do experience their house as unsafe.

Hugo (70-74) & Thea (70-74) link their feelings of unsafety to other aspects of the reinforcement project. Some of the houses in their neighbouring block are unoccupied, because these residents are currently staying in temporary accommodations. The idea that they are living between unoccupied houses, makes it less safe. Moreover, their neighbourhoods' dog functions as their main security, in case something strange happens around their house. The dog always started to bark, when someone was walking past their backyard. Nowadays, they have no idea whether something is happening outside their house or not.

A couple of months ago, Hugo (70-74) & Thea (70-74) saw three men, all wearing hoodies, walking around their neighbouring block. They finally found out that these men were probably the burglars who tried to break into a gas station nearby later that day. Their sense of safety has further decreased after this event took place. They were hoping for extra security in the neighbourhood, and addressed this issue to the municipality. *"There is no street light, nothing. You don't see a thing, it's extremely dark"* (Hugo, 70-74 & Thea, 70-74). However, to this day, the municipality has not responded to their request, which created a loss of trust in the municipality.

### 5.2.2 Postponement of renewal and conservation of the house

Many participants postpone activities that need to be done in and around the house. This includes, among others, painting the inner walls and buying new furniture. Participants who postpone the renewal of their furniture take this decision because they will need to store it in large containers for several months, while they are living in a temporary accommodation.

*"Especially the furniture. We are a bit worried about that. And that is also the reason why we are not buying new furniture at the moment. We would like to have a new refrigerator, a new bed and some other stuff. However, we are only going to purchase it after we have moved back to our new house. After we've returned. We don't feel like purchasing it now and then all the furniture will be damaged afterwards"* (Mark, 55-59).

One of the tenants also pointed out that the housing corporation is not doing any thorough maintenance at the 'reconstructed' project houses. Their window frames need replacing, due to draught. The housing corporation is not replacing or renewing anything unless it is urgent, because the houses are being demolished anyway.

Many participants indicate that they experience degradation in the neighbourhood. For example, residents are taking less care of their garden. Three participants have pointed out that this is also the case regarding their garden. The reason behind this, and behind the other activity postponements, is the uncertainty regarding the housing plans, but also the knowledge that most houses, including the gardens are being demolished in the near future.

Besides the postponing of renewal and conservation, participants also experience a lack of interest in activities around the house. This has partially to do with the postponement, but also with the fact that the participants are just tired of everything that is going on concerning the house. Participants indicate that they do not only postpone renewal and conservation of the house because their house will change anyway, but it is also the feeling of tiredness that this postponement is causing among them.

*"I don't feel like it anymore. I.. so maybe something will happen. It all seems like it's so pointless, if it's temporary. And I always thought that I would be living here until I die"* (Tjeerd, 55-59 & Linda, 55-59).

Fried (1963) argues that people who are forced to move out of their house may experience grief and distress. It seems that some of the participants, including Tjeerd (55-59) & Linda (55-59), are already in the process of bidding their house goodbye. The long-term uncertainty, the actions of authorities

and the knowledge that they will have to leave their house soon, impacts their sense of home. Although there is little literature on the process of saying goodbye in this context, Davies (2005) describes a similar process of Kübler-Ross's work, where terminally ill people know they are dying soon, but this process could also relate to other people losing their loved ones. These people may react in five different ways: denial and isolation, anger, bargaining, depression and acceptance of the fact that they are dying. It is possible that the participants, knowing they are losing their home, are reacting in similar ways. In this study we see participants reacting in four of the five different ways, excluding the reaction of denial and isolation. Some of them have already accepted that they have to leave, while others, like Tjeerd (55-59) and Linda (55-59), are still experiencing some degree of depression or grief.

### 5.2.3 Changing in 'Sense of home'

Most of the participants experience a change in their sense of home caused by earthquakes and the reinforcement project. Reasons, among others, are a decrease in enjoyment of residence and the loss of control towards one's home. In the latter, participants indicate that they have the feeling that the authorities have become in charge of their house. *"You're always the loser. Yes. That's right. And you just have to, it's just like someone else is in control of your home"* (Tjeerd, 55-59 & Linda, 55-59).

The loss of control towards one's home, relates to the discussion in Carroll et al., (2009). They indicate that people's control towards their home disappears when a disaster takes place. This is also currently happening in Opwierde-Zuid, as authorities are now mainly in charge of the reinforcements and reconstruction of the houses, which creates this feeling of loss of control. This feeling among the participants in Opwierde-Zuid, has partially developed due to their lack of influence on their housing plans. The lack of influence experienced by the participants will be further discussed in the theme 'actions by authorities'.

Also, participants indicate that the reinforcement project changed how they view their homes. This is because there is so much going on concerning the home, such as damage, feelings of unsafety and changes in physical appearance of the house. Three couples pointed out that they experience a sense of loss towards their home. Earlier research, already concluded that people who are forced to move out of their homes, can experience a loss of sense of home (Bolt et al., 2011; Carroll et al., 2011; Van der Graaf & Duyvendak, 2009). Their home means everything to them and due to the reinforcement, they experience that they are losing the place that they have invested so much time, money, energy and love in. *"Yes, and you will soon lose everything. You are not going to get it back. You will not be getting these bushes and plants..."* (Geert, 70-74 & Ingrid, 70-74).

It is according to some participants also not their place of safety anymore. This has largely influenced their sense of home.

*"This is my home. My safe haven, but it doesn't feel like that anymore. Since the, yes well yes, since I've discovered all the cracks inside the house. Were they already here? Oh mmm.. It is strange that my shed is no longer fixed to the house and yes does my upper floor also sag? This kind of things, your sense of safety is decreasing, let me put it this way"* (Noortje, 50-54).

As mentioned earlier, Fonad et al., (2006) indicate that a home should function as a place of safety. This is not Noortje's (50-54) experience with 'home' anymore.

The homeowners of the 'purchased housing reinforcements' project also indicate that the loss in asset value of their house, due to both the earthquakes and the reinforcement project, has changed in how they view their house. They mentioned that it is more difficult, or even impossible, to sell the house at this moment. Selling the house can only be done under the purchased value, which will cause high losses for the residents. One of the couples of the 'purchased housing reinforcements' project would

like to move to another house somewhere in the region of Appingedam. However, because they cannot sell their house anytime soon, they experience a sense of place alienation. Carroll et al., (2009) also explain this situation as an alienating experience. They concluded that people can experience a sense of place alienation when the bond between them and the house is already broken, and trying to sell the house is extremely difficult and takes too much time.

The other four participants do not experience a change in their sense of home. However, two of these participants have changed their perspective on their home, due to the knowledge that the house is going to be reinforced. Despite this, these participants do not experience their current house differently.

Before the 'rental housing reinforcement' project was set on hold, two out of the three participants already packed their belongings into moving boxes and were ready to move into a temporary house. Today, they still have unpacked moving boxes stored in their house, and one of the couples also stored important belongings at their children's homes. The latter couple experiences a change in sense of home. This is due to fact that the house is less cosy and that the house feels less like their own, without all their belongings. Especially the wife is fond of flowers and associates this with a cosy home.

*"I try to have as many as I can, and then there were also some in the bathroom. I had flowers everywhere. Even on our bed, next to our bed we had a row full of flowers. On shelves on the walls we had flowers. In the shower and in the children's room were plants. Everything is gone now, it's all gone"* (Hugo, 71 & Thea, 71).

Carroll et al., (2009) explain that people have a big personal investment in their house, turning a house into a home. This is also the case with Hugo (71) & Thea (71), who decorated their house according to their personal taste and wishes. Without their belongings and as described in the quote; the flowers, their house feels less like a home now. This relates as well to the idea that Hugo (71) & Thea (71) are already in the process of saying goodbye to their home.

The residents in the pilot housing project still have no idea when they will be moving out. That's why these two couples have decided not to unpack all their boxes, and are awaiting further news. They have been waiting since September 2017 for any clarification considering the restart of the project, which has largely set pressure on their patience.

### 5.3 Neighbourhood attachment and atmosphere

The participants experience the neighbourhood as social, vibrant and a good place to live. However, the latter experience has changed, according to some participants, since the reinforcement project has been announced. Everyone enjoys having conversations with their neighbours, although they do not meet or see each other on a regular basis. Four participants indicate that they feel highly attached to Opwierde-Zuid. The other five feel moderately attached to the neighbourhood. In general, there is no clear answer why some participants indicate to be more attached to the neighbourhood than others. Homeowners and tenants showed no difference regarding the level of neighbourhood attachment. This contrasts with the theory of Rohe & Stewart (1996) and Brown et al., (2003) who indicate that homeowners are usually more attached to their neighbourhood than tenants.

The effects of the reinforcement on the atmosphere of the neighbourhood are mostly negatively experienced. Only one couple indicate that the reinforcement has a positive effect on the social cohesion in the neighbourhood.

*“Well I think that the relationship, in some cases, improved. Because people teamed up because they are in the same situation. People talk more with each other. They also listen more to one another. That’s what I think”* (Niels, 50-54 & Deborah, 45-49).

There is one participant who does not experience any difference in the neighbourhood atmosphere, between before the reinforcement was announced and when the interview took place. The other 7 participants experience a mainly negative effect of the reinforcement on the neighbourhood. The reinforcement project has created unrest among the residents. This unrest is created due to lack of information about housing plans, the different housing projects and the decisions made by authorities. The lack of information about the housing plans has caused for uncertainties. All the participants have no idea what to expect. Participants are left with questions such as: What will the finished house look like? How much compensation will they receive? Is someone else getting more compensation than me? And is my neighbour managing to make a better deal with the authorities than me? One of the participants indicate:

*“It’s not going to get any better. No, and especially because there are rental houses and owner-occupied houses. How are they going to do that? Are those people, are they being privileged compared to us? Or will they get the same? That can cause a lot of trouble in the future. For example, those people are able to manage everything themselves while and the housing corporation, our kind of people say, forget it. We’re not going to do that. Well, I think this is highly unequal. I mean, these are exactly the same houses. I’m not sure, but that makes me a bit anxious. For God’s sake, what will happen? Maybe the housing corporation says no we’re not going to do that, no we won’t do that. And over there they will say, we will manage it. For example, the small shed. All those people have a small shed in their backyard. Will they get it back? Of course the small shed will also be demolished”* (Geert, 70-74 & Ingrid, 70-74).

Although, Lindell & Prater (2003) and Carroll et al., (2009) discuss disruptions within community during a recovery period of a disaster, their theory can relate to the experienced atmosphere in Opwierde-Zuid at the moment. Lindell & Prater (2003) state that the aftermath of a disaster can lead to frustrations and possible disruptions within communities. Also, Carroll et al., (2009) argue that disasters can on the one hand strengthen the ties with neighbours, but they can also set relationships under huge pressure. Participants experience the consequence of the earthquakes, in this case the reinforcement project, as something that is creating a huge pressure on the community.

There is a more negatively experienced atmosphere in Opwierde-Zuid. Residents have become more angry and frustrated over time and sometimes this results in heated debates. Moreover, some participants state that they experience jealousy among the residents. This is primarily pointed out between the project ‘reconstruction’ and the houses that are only being reinforced (‘rental housing reinforcement’ and ‘purchase housing reinforcement’). The latter housing project residents also prefer a newly constructed house and are therefore dissatisfied with the current situation. This sometimes creates feelings of jealousy towards the ‘reconstruction’ project in the neighbourhood. Important to highlight is that not every participant experiences this within the ‘rental housing reinforcement’ and ‘purchased housing reinforcement’ project. Furthermore, the conversations between neighbours also create unrest. There are residents who tell different stories about aspects of the reinforcement than others, which results in an increase in uncertainty and confusion.

Many of the participants point out that the authorities also contribute to a divided neighbourhood. The neighbourhood has been divided into several projects from the beginning. This created a different sense of treatment between the residents. One of the participants said: *“They applied a divide and conquer strategy. Dan ben je als wijk, nou dan ben je al weg”* (Erik, 45-49). The authorities not only

divided the neighbourhood into several projects, but the 'purchased housing reinforcement' project has additionally been divided into two different approaches: the corner houses and the houses that are in between these two corner houses. This has resulted in further unrest and feelings of unfair treatment among these residents. Some participants also experience an unequal distribution of information about the housing plans, which contributes to the unrest and division in the neighbourhood. Lastly, the residents have the feeling that they are not being compensated equally.

*"It is, that's just a huge, and that's my personal opinion, a huge mistake what they can do to people. You need to unite people. And not create a situation like, those people receive 500 euros and someone else 250 euros. That's not going to work, because then you will get a situation like: why do you receive 500 euros and I'm only receiving 250 euros? People are saying that.. This approach is just.. you don't create a unity in the neighbourhood"* (Hugo, 70-74 & Thea, 70-74).

## 5.4 Actions of authorities

The attitudes, decision making and lack of communication of different actors towards the residents of Opwierde-Zuid has triggered anger, disbelief, distrust and incredulity. The emotional and in some cases, psychological effects, of the reinforcement project will be discussed in the next theme. First it is important to give an overview of the participants' perceptions of the actions of the different actors.

### 5.4.1 Communication

The communication with the housing corporation, municipality and the Nationaal Coördinator Groningen is all experienced as poor. Most of the participants, 8 out of 9, are dissatisfied with how these authorities communicate with the residents. As a matter of fact, some participants indicate that the authorities do not communicate with them at all, or in some cases very minimally. This lack of communication by the authorities is often mentioned as highly frustrating.

*"Well poorly. They did not consult with us, about anything, before they started this process. They did not involve us from the start, in the decision-making process. They just made an announcement: this is what's going to happen and you don't have any influence on it, on what will happen. And in particular the communication with the housing corporation is poor. You need to be on it yourself. And then hopefully you will get an answer. But that takes a lot of effort"* (Mark, 55-59).

Firstly, the authorities do not provide enough information about the housing or neighbourhood plans and when they provide information, the plans often remain unclear. Plans are not announced properly, which causes unexpected surprises for residents. Moreover, the time between information is often too long. Participants regularly have no idea what to expect, which makes them insecure. As Burdge & Vanclay (1996) also indicated, a newly announced project can create much uncertainty among people. This is mainly due to that people have no idea what to expect. They explain that it is therefore important to involve the ones who will be affected by the planned interventions, because this can reduce their uncertainty.

The authorities also do not provide enough information about other executive projects in the neighbourhood. Many participants would like to stay informed about the different projects within their neighbourhood, because it concerns their living environment.

Secondly, the authorities rarely give feedback on the questions asked by residents. *"If they couldn't manage it, they should have given feedback on that. And say I'm sorry, but it is not possible at this moment. But they have never responded to this"* (Hugo, 70-74 & Thea, 70-74). They feel highly ignored in these situations. As a result, this increases the residents' dissatisfaction towards authorities.

Thirdly, participants also indicate that there is a lack of communication within authorities and construction companies. There have been moments where different employees of the same company visited them multiple times regarding the same requests. These visits are experienced as highly annoying, due to the extra time, energy and frustration it causes for the residents, besides the already other experienced impacts of the reinforcement.

#### 5.4.2 Lack of influence

Participants experience a lack of influence on the projects that are taking place in the neighbourhood. Residents are rarely asked for their opinion and if they try to share their ideas and thoughts about the projects, authorities do not seem to take these into account. Participants who are members of committees and the tenants' association, point out that authorities (housing corporation and Nationaal Coördinator Groningen) do not listen to their ideas and requests either. These participants experience the meetings with authorities more as a briefing moment, than as an opportunity to share and discuss ideas and different points of view on aspects of the project.

As already mentioned above, Burgde & Vanclay (2003) and Vanclay et al., (2015) argue the importance of involving possible affected residents in the decision making process of a planned intervention. In this way, residents can have an influence on the outcome of a project, and support for the project will be much larger, than when authorities only consult them about the already created plans.

It seems that the authorities are applying a top-down approach, which gives the participants the feeling that the authorities are always one step ahead of them. They rather want the authorities to discuss their ideas and thoughts before they start creating a plan. As Mark (55-59) mentions above, this creates a feeling that the residents have to adapt to the plans of the authorities, even if they do not agree with it.

The feeling of not being involved in the decision-making about their house and living environment is causing a lot of frustration, anger and disbelief. *"The feeling of not being involved and well yes, and the fact that we. How do I say this in a polite way. That we just have to grin and bear it"* (Mark, 55-59).

Carroll et al., (2009) indicate that it is important for people to be involved by the restoration of their homes, because it is experienced differently if it has not been done voluntarily, but instead decided by others how and when it is taken place and by whom. In Opwierde-Zuid, residents have almost no influence on when it will take place, by whom and how the appearance of their house will look like.

#### 5.4.3 (Increase) in loss of trust

The lack of communication from authorities and the applied top-down approach, increases the loss of trust in authorities among residents. Many other events and aspects, concerning the earthquake matter and reinforcement projects, have resulted in a further loss of trust in authorities, from which most of them already indicated throughout the previous themes.

The government did not respond as adequately as the participants wanted on the events that have been taken place in this region. The government should have responded earlier by reinforcing the houses and by extracting less gas, instead of taking a wait-and-see attitude. Tapsell & Tunstall (2008) have pointed out that the response of authorities on disasters is of great importance when it comes to trust. When a government is not responding as adequately as the victims of the disaster want, a loss of trust can occur. This is highly noticeable in the earthquake area, as these residents experience a decrease in trust, each time authorities do not respond as adequately as they want on events that concern their safety and liveability.

Furthermore, the authorities, especially the housing corporation, are seen as unapproachable, distant and curt. Despite that some participants indicate that they refused to co-operate or are highly against particular ideas concerning the plans, authorities still seem to maintain their own ideas and approaches, instead of involving the residents in the decision-making process. Moreover, participants are highly doubting the promises that are being made by the authorities, especially promises from the Dutch government. Participants do not experience their safety and liveability, as a main priority of the Dutch government. This is because they experience a government that is more concerned about the costs of the reinforcement programme, than about the people who are living in the earthquake area.

Also, the authorities in charge of the reinforcement, talk much and are promising many things, but the participants do not see any outcomes of this so far. Participants have therefore difficulties in believing the authorities and distrust their intention towards the reinforcement. Additionally, two participants indicate that they have received misinformation from the housing corporation about their housing project. They were not pleased when they found out that the information that was provided did not match the actual executive orders.

#### 5.4.4 Uncertainty regarding the gas extraction decision-making

There is a lot of uncertainty and insecurity among participants concerning the reduction of gas extraction from the Groningen gas field and its consequences on the reinforcement of the houses in this province. The participants wonder if the government has enough money to spend on the entire reinforcement programme in the province of Groningen, especially when they also receive less money due to the reduced profits from gas extraction. The lack of trust in the government was highly noticeable when participants were discussing this topic.

*“That’s not going to happen. The latest developments from our government; reducing the gas extraction to zero. That’s not going to happen, because there will be less earthquakes. And then they will say, well yes. Less problems, less difficulties and an increase in safety. I’m saying this maybe a bit.. she can express it better than me. I already noticed it immediately. I saw Rutte on the television in a press conference and he said: We’re reducing the extraction to zero. Hahaha, meneer doet een duit in het zakje”* (Hugo, 70-74 & Thea, 70-74).

This lack in trust towards the Dutch government, also mentioned in 5.4.3, mainly has to do with the fact that the participants experience a Dutch government that is more concerned about their money than the safety of the residents in Groningen. *“Because money is still a higher priority than the safety of a citizen”* (Erik, 45-49).

Many participants do think that the reinforcement plans for their neighbourhood will continue, however they fear that the rest of the province is less lucky. *“Surely this neighbourhood I think, but not the rest. The rest will all be... if they notice how much money it costs in Den Hague, I think, they will think like ooh”* (Niels, 50-54 & Deborah, 45-49).

The majority of the participants mention Norway as a model oil producing country regarding their wealth distribution. They support the idea that Norway is putting its oil income into a public fund to the benefit of its own people. *“And Norway was very clever. They just put the money aside”* (Tjeerd, 55-59 & Linda, 55-59). Especially the idea that the Dutch government mainly spent all its oil income on different large-scale projects across the country, instead of reserving it for possible problems which are now occurring in Groningen, led to the participants feeling unappreciated by the government. The participants have the feeling that the government used the Groningen gas field, but did nothing in return to the people who are living in this region.

*“Yes... let’s just be honest. They just used us. Right? That’s the case. And I mean it’s nice, Flevoland and such things, but that is all financed by means of our money. That’s nice and its okay, I don’t mind. It’s about time that we get something in return. They knew that this was going to happen. That’s just logical. If you extract gas from a field, that creates a space in the ground. You know that. (..). I think they were too lenient about this” (Joost, 45-49 & Sylvia, 35-39).*

#### 5.4.5 The Netherlands vs. the Groningen earthquake area

According to some participants, besides the lack of support that the Dutch government is providing the Groningen residents, the rest of the Netherlands is not interested in the problems that are occurring in Groningen either. The media has reported on the earthquakes in Groningen and their consequences many times. Opwierde-Zuid is regularly mentioned in the newspapers and on television too. A group of residents in this neighbourhood has tried to use the media to create higher awareness about their situation towards the Dutch government and citizens. However, two participants explained that they still experience a lack of awareness in the rest of the Netherlands. They think that this lack of awareness is mainly because the rest of the Netherlands is not faced with the same problems as they are. According to these two participants, Groningen is portrayed and seen as a disadvantaged region, where only ignorant people live.

*“Well I believe that these people have this image of people in the north, oh well, yes. Hardly, hardly positive. A bit, yes how should I explain this. A bit of an ignorant group. At least, that’s my feeling, if you hear those people. Yes” (Jeske, 65-69).*

If a similar situation would take place in the Randstad, governments and residents would have responded more quickly. *“I think when something like this would have happened in the west, then everything would be solved much faster. That’s what I think. Groningen is on that level, a disadvantaged region in their eyes” (Tjeerd, 55-59 & Linda, 55-59).* This idea of being a disadvantaged region did not change when former Minister Henk Kamp was succeeded by Minister Eric Wiebes. Over the years, Tjeerd (55-59) & Linda (55-59) have lost their trust towards governmental institutions, and it seems that the arrival of Minister Eric Wiebes did not increase their trust.

### 5.5 Psychological and emotional impacts

Until today, the reinforcement project has a large emotional impact on the residents of Opwierde-Zuid. Many of the participants were emotional during the interview, as some were angry, frustrated and others seemed to feel more insecure or powerless. The participants’ opinion and the often emotional feelings attached to this, about among others, aspects of the reinforcement and regarding the authorities, became very clear while the interview continued. Eventually, the emotional impacts on residents in this neighbourhood seemed so large-scaled, that this has resulted in a theme within the coding scheme. Some emotions have already been discussed within other themes, but this paragraph, will provide a clear and short overview of all the experienced emotions and health impacts of the 9 participants.

#### 5.5.1 Emotional impacts

Some of the participants experience more emotions than others, regarding the reinforcement project. There are a few participants who try not to get involved too much in the whole reinforcement project, and rather want to see it through first. These participants also have a more positive attitude towards the reinforcement project, opposed to the participants who experience health problems and who are more emotional.

The emotions experienced because of the reinforcement project include, amongst others, uncertainty, frustration, anger, powerlessness, anxiousness, tiredness, and disbelief. There is much frustration among the residents towards the entire reinforcement project and how it is managed by the authorities. They feel wronged by the already partly executed plans, resulting in dissatisfaction and anger. Due to a repeated change in plans, and broken promises, distrust towards the entire reinforcement project increases over time. This can be linked to the research of Postmes et al., (2018), in which they conclude that the lack of trust and feelings of injustice can have a negative effect on people's health.

Uncertainty also plays a constant role, due to the vagueness of the housing- and neighbourhood plans and lack of communication by authorities. At the same time, the participants have the feeling that they have no influence on the project at all and are forced to give their support even when they do not want to. This creates feelings of powerlessness and incomprehension. Mark (55-59) is summarizing this as:

*"But it does keep you busy. Me as well. That the housing corporation does, well yes, not communicate with us. That everything is not going as it should be. So, the uncertainty is playing a large role. The feelings of uncertainty. And also partly, the feelings of powerlessness. At this moment, the authorities seem to control everything. You are left in the hands of all kinds of organisations"* (Mark, 55-59).

According to the participants, it is frustrating to experience that the reinforcement is only focused on the houses, and that the residents are often forgotten. On top of that, the noise in the neighbourhood is also experienced as annoying by some participants. One couple is getting so annoyed by it, that it is driving them nuts. During the interview the noise was clearly noticeable as well. *"Well you can hear it. This is going on for almost 7 months already. All day long. It is driving you nuts"* (Tjeerd, 55-59 & Linda, 55-59). The experience of annoyance can be linked to the theory of Shepherd et al., (2013) and the report of WHO (2011). Shepherd et al., (2013) explain that disagreeable soundscapes can create a sense of annoyance. The WHO (2011) considers annoyance as an environmental health burden, due to that it affects people physically and mentally and people's social well-being as well.

Lastly, the participants are not only concerned about their own house, but are also concerned about the injustice that occurs in the neighbourhood. Several participants have chosen to take part in committees, because the injustice has made them combative. However, this also has its consequences, as these participants are more involved in the reinforcement project, which increases their emotional impacts, such as stress and feelings of being wronged.

That being the case, for some participants the reinforcement project has completely drained them emotionally. There are so many aspects that have an emotional impact, that it has made the current situation almost unbearable. *"But with the whole earthquake matter, especially the reinforcement project that is occurring here, is that people are just mentally drained. That is true thought"* (Erik, 45-49).

### 5.5.2 Impact on health

Almost half of the participants experience health problems which they relate to the reinforcement project. This includes chronic headache, stress and tiredness. Some of the participants indicate that they are constantly reminded about the projects in their living environment, which results in overthinking and by some in troubles with sleeping. *"Yes of course you have stress. You overthink too much, every day you think about it"* (Geert, 70-74 & Ingrid, 70-74). Three participants already had health problems, such as a burn-out. They pointed out that this reinforcement project is an extra burden on the problems they already experience concerning their health. Research has shown that the aftermath of a human-made disaster, in this case the reinforcement project, can have an additional

impact on victims psychological health and well-being (Carroll et al., 2009; Erikson, 1994; Galea et al., 2005; Tapsell & Tunstall, 2008; Verger et al., 2003).

### 5.5.3 Impact on close relationships

Two participants indicate that the reinforcement also has impact on their relationship within their family. Impact on close relationships, can be linked to the theory of Carroll et al., (2009). They argue that disasters, but also the aftermath of disasters, can set relationships between family members under pressure. The participants indicate that they express their dissatisfied feelings most of the time in the presence or towards their close family. This has led to some controversy moments within the household. Mark (55-59) describes this in his interview:

*“But I know perfectly well that my wife needs to express her emotions. I try to be open for that as much as I can. And lately, we have had a fight recently, but lately it is going steady again. Right?”* (Mark, 55-59).

## 5.6 Overall experience

In the thematic approach, impacts of the reinforcement project have been discussed separately. However, the experiences in these themes are all linked to each other, which results in an overall experience. The overall experience indicates if a participant has a rather negative or a positive attitude, regarding the reinforcement project. The overall experience of a participant is based on all the aspects that are discussed within the previous themes. As described in the data analysis section, the interviews were analysed by hand. This is done to provide a clear overview of the topics that participants have a positive or a negative opinion on.

None of the participants experience the reinforcement as overall positive. Two participants have a partly positive experience, two have a partly negative experience and 5 participants have a largely negative experiences towards the reinforcement. The two participants, Joost (45-49) & Sylvia (35-39) and Jeske (65-69), have a partly positive experience so far on the reinforcement and are both tenants from the ‘reconstruction’ project. In general, they experience less negative effects on their lives, and see more opportunities that the newly built house will provide for them, opposed to what the other participants experience. This is mainly due to that they will receive a newly constructed house, instead of only reinforcements.

*“We are very enthusiastic about that. I mean, what we get in return. It is only beneficial for us”* (Joost, 45-49 & Sylvia, 35-39).

However, these participants also experience feelings of uncertainty and dissatisfaction. The participants, Noortje (50-54) and Niels (50-54) & Deborah (45-49), have a partly negative experience towards the reinforcements, because they are experiencing mostly negative impacts on their lives. They also experience opportunities and positive impacts, but this is overshadowed by the problems they are faced with. Noortje’s (50-54) attitude towards the reinforcement has changed mainly due to the announced changes in the ‘purchased housing reinforcement’ project plans. However, her experiences so far with the earlier reinforcement plans, were mostly negative.

The five participants who experience the reinforcement as mainly negative, Erik (45-49), Mark (55-59), Geert (70-74) & Ingrid (70-74), Tjeerd (55-59) & Linda (55-59) and Hugo (70-74) & Thea (70-74), have so far only experienced negative impacts of the reinforcement on their lives. They also see hardly any opportunities that the reinforcement can provide for them, especially not when it is being executed according to the current plans. The different aspects, explained within the themes, have caused this

overall negative experience. Thus, not only one aspect, but multiple aspects such as lack of communication, uncertainty, assumptions within the project etcetera has caused this negative experience.

*“It is also especially that. The entire situation, the packages of distrusting each other, communication, to unburden, promising this, but later it is being reversed. That is the entire, that makes it so uncertain”* (Hugo, 70-74 & Thea, 70-74).

To conclude, the following quote by Mark (55-59) covers these five participants’ experience:

*“But it is so wrong what is happening here. It has caused, by many people, a large impact. Deeper than we could have imagined with each other”* (Mark, 55-59).

Table 3 presents an overview of the participants’ experience of each theme. The overall experience, as in this case the impact, is based on all themes together.

Participant	Theme 1a: housing plans*	Theme 1b: neighbourhood plans*	Theme 2: impact on sense of home	Theme 3: experience of neighbourhood atmosphere	Theme 4: experience of actions of actors	Theme 5: impact on emotional health	Overall experience
Geert & Ingrid	+ -	+ -	Decrease	Negative	Negative	Yes	Negative impact
Mark	- -	+ -	Decrease	Negative	Negative	Yes	Negative impact
Erik	- -	+ -	No impact	Negative	Negative	Yes	Negative impact
Joost & Sylvia	++	+ -	No impact	Negative	Negative	No	Partially positive impact
Niels & Deborah	+ -	+ -	No impact	Positive	Negative	Partially	Partially negative impact
Hugo & Thea	- -	+ -	Decrease	Negative	Negative	Yes	Negative impact
Jeske	++	+	No impact	Neutral	Neutral (does experience loss of trust)	No (not anymore, but in the beginning yes)	Partially positive impact
Tjeerd & Linda	- -	+ -	Decrease	Negative	Negative	Yes	Negative impact
Noortje	- -  new housing plans: +	+ -	Decrease	Negative	Negative	yes	Partially (because of new housing plans) negative impact

Table 3. Overview of the social impacts on the participants. \* In theme 1 and 2, ++ = satisfied, + - = partly satisfied, - - = dissatisfied.

## 6. Conclusions and discussion

The aim of this research was to analyse the social impacts of the reinforcement project in Opwierde-Zuid on its residents. For this, we used seven aspects described by Vanclay (2003): *people's way of life, their community, their environment, their political systems, their health and wellbeing, their personal and property rights and their fears and aspirations*. In this section, we will draw conclusions from these interviews, and try to answer the research question.

In general, we can conclude that there is an impact in each of these areas. The reinforcement project has a large impact on the lives of the residents in Opwierde-Zuid, not only on a material level, but also on the emotional, physiological, social and economic level. Residents are constantly reminded of the impact it will and already have on their lives, as it concerns their living environment, more specifically their home.

In line with previous studies (Case, 1996; Falk et al., 2012; Lewicka, 2011; Moore, 2000; Parsell, 2012), this research shows that for most people, their home means everything. It symbolizes safety, comfort and rootedness. People often invest in a house, personally, emotionally, and financially (Carroll et al., 2009). Most of the residents that participated in this research had turned their house into a home, and decorated it according to their own personal taste and wishes, and they indicated that they experience a high place attachment towards their house (Brown & Perkins, 1992).

To answer the second sub question (does the reinforcement project impact the residents' sense of home?), the reinforcement project has caused a change in sense of home for the majority of the participants. The main reasons for this are a decrease in enjoyment of residence and a loss of control towards the home. Their enjoyment of residence has decreased, they lose interest in undertaking activities around the house, or they postpone renewal and refurbishing projects, based on the thought that their house will be reinforced or demolished in the near future. Moreover, the decrease in enjoyment of residence is also influenced by other factors, the reinforcement itself, a negative atmosphere in the neighbourhood and unpacked moving boxes, which causes a less cosy house. Secondly, residents experience a loss of control towards their house. This is caused by the authorities being in charge of how, when and by whom the reinforcements take place. Research has shown (Carroll et al., 2009) that it is important for residents to have influence on the reconstruction process. However, authorities barely take residents' wishes and ideas into account, despite it being acknowledged as of great importance in creating support for planned interventions (Burgde & Vanclay (2003). The results of this research show that the support of this reinforcement project is extremely low among the residents within this research.

In reference to the third sub question (which parties are involved in the Opwierde-Zuid reinforcement project, what are their roles and perceptions and how does this impact the residents?), it seems that authorities are mainly focused on reinforcing the houses, and often forget the residents who are living there. The feeling of not being involved in the decision-making about their own house and living environment, makes the residents feel frustrated and angry, which leads to a decline in support of the current reinforcement plans.

For most residents, support for the reinforcement plans was already minimal, especially for those of the 'purchased housing reinforcement' and the 'rental housing reinforcement' projects. These residents disagree with how the reinforcements are being executed. Homeowners are mainly concerned with three aspects of the reinforcement. Firstly they distrust the technical executive of the plans, due to constant changes based on, in their eyes, mere assumptions. Secondly, the houses will receive minimum sustainability, which does not correspond to the idea of making more houses sustainable in Groningen. Thirdly, homeowners see no economic perspective in their current housing

plans. Besides, homeowners within this research already experience a loss in asset value of their house due to the earthquakes, which is in line with earlier research of De Kam & May (2017) and Duran & Elhorst, (2018). The reinforcement project causes additional difficulties, or even makes it impossible for these homeowners to sell their house at this moment. This is due to that a large part of the neighbourhood is being demolished and reconstructed, whilst homeowners remain with a house that will receive minimal safety and sustainability. Homeowners in Opwierde-Zuid that would like to move but cannot sell their house, experience place alienation (Carroll et al., 2009). They have no choice but to stay in their current house, despite the bond between them and the house already being broken.

In accordance with the research of (Bolt et al., 2011; Carroll et al., 2011; Van der Graaf & Duyvendak, 2009), some residents in Opwierde-Zuid experience a loss of home, due to the forced move. Their home is important, and this reinforcement project causes a breaking of bond between these residents and their home (Carroll et al., 2009). It seems that especially those who lived in the neighbourhood the longest, have a sense of loss and nostalgic feelings (Zwiers et al., (2016) towards their homes. This affliction (Kleinhans, 2005) takes place because residents with a stronger bond with their home also have more chance of experiencing a sense of loss towards it. However, it is important to mention that not every resident participating in this research experiences their home differently than before the reinforcements took place. It is possible that this can change over time, as their houses are not being reinforced or demolished and reconstructed yet.

It seems that some residents are already saying goodbye to their house, caused by a change in sense of home, which changed due to, among others, decreased enjoyment of residency, loss of control, long-term uncertainty and actions of authorities. In accordance with Davies (2005), we have observed four different reactions to the fact that they are losing their homes: anger, bargaining, depression and acceptance.

The neighbourhood is being revitalised while reinforcements are taking place. Residents view the outcomes of this, such as improved public spaces and a more attractive neighbourhood (Bolt et al., 2011), as a potential positive impact on their lives. However, the idea that they will be living in a construction zone for the upcoming years is experienced as having a negative impact. The revitalisation is being executed at an inconvenient time, as it adds extra stress to their lives during the reinforcements. Residents are also concerned about the inconvenience (Golmohammadi et al., 2013; Xue et al., 2015) that it will create.

In contrast with the theory of Rohe & Stewart (1996) and Brown et al., (2003), homeowners do not seem to have higher neighbourhood attachment than tenants in Opwierde-Zuid. Furthermore, this study shows that in the aftermath of a disaster, in this case the reinforcement project, relationships within a community are put under huge pressure (Lindell & Prater, 2003; Carroll et al., 2009). The effects of the reinforcement project have a negative impact on the atmosphere in the neighbourhood. This is mainly due to the unrest it has created among the residents, caused by lack of information about housing plans, the different housing projects and decisions made by the authorities. Also, the residents themselves can create unrest by telling different stories about aspects of the reinforcements. Jealousy is also experienced in Opwierde-Zuid, as some residents would rather see their houses being demolished and reconstructed, than only being reinforced. Some residents see the latter option as a worsening of their current living situation, rather than the envisioned improvement.

Authorities have further contributed to the division by launching different reinforcement projects within the neighbourhood, causing a sense of different treatment among its residents. The choices that authorities have made lack input from the residents. As a result, residents do not always agree with or support their plans. Their communication is experienced as poor, as they do not provide enough or unclear information on the housing or neighbourhood plans. Furthermore, authorities

rarely give feedback on the questions asked by residents, making them feel ignored. This lack of communication and the top-down approach has resulted in a loss of trust towards authorities.

This research substantiates other studies (Tapsell & Tunstall, 2008) in concluding that it is important for governments to respond to disasters adequately, building trust between victims and governments. In this case, the Dutch government has not responded to the earthquakes in the way the Groningers expected, resulting in a loss of trust. The government also seems to be more concerned about their money than about the safety of the residents. Although the majority of the residents within this research indicated that they do not feel unsafe within their house, they do think it is important for their houses to be strengthened. The residents that do feel unsafe, mainly point to their damaged homes as being the reason.

This study shows that a reinforcement project can have a large emotional impact on residents. The majority of the residents who participated in this research experience many emotions, such as frustration, anger, powerlessness, anxiousness, tiredness, uncertainty and disbelief. For some residents, the reinforcement project has completely drained them emotionally. Moreover, residents who experience noise due to construction work are highly annoyed by this. Noise annoyance can be a serious health burden, due to that it can affect people mentally, physically and their social well-being (Shepherd et al., 2013; WHO, 2011). Almost half of the residents who participated in this research relate their health issues to the reinforcement project. Stress, tiredness and chronic headache have become serious health issues within their daily lives. Additionally, the reinforcement project is experienced as an extra burden on residents who are already faced with health issues. This is in line with research of (Carroll et al., 2009; Erikson, 1994; Galea et al., 2005; Tapsell & Tunstall, 2008; Verger et al., 2003), which indicates that the aftermath of a human-made disaster, can have additional impact on victims' psychological health and well-being. In accordance with previous research of (Carroll et al., 2009), relationships within families can also be put under pressure. Residents have indicated that they share their emotions often in the presence or towards close family, which can create controversy moments. Moreover, relationships between family members can also be set under pressure by being relocated to a temporary accommodation, as some residents are afraid that they cannot perform their daily routines as adequately as they are used to.

Although residents within this research have not yet experienced living in a temporary accommodation themselves, they already mentioned the impact this can have on their lives. Being relocated to a temporary accommodation brings uncertainty, as residents have often no idea what to expect regarding their new neighbours or what belongings to bring. Some residents dislike the idea that their furniture is in storage, because they are afraid of possible damage that cannot be restored or replaced (Carroll et al., 2009). In line with earlier research of Carroll et al., (2009) and Proshansky et al., (1983), residents can experience an interruption in their daily routines, as they cannot practise their hobbies during their stay in the temporary accommodation.

In conclusion, most residents in Opwierde-Zuid are aware and agree that their houses need to be reinforced. They support the idea behind the reinforcement; making houses safer and more sustainable. However, many residents are unsatisfied with how the reinforcement plans are being executed. The authorities should have involved residents in the decision-making process of the reinforcement project, as this could have reduced their feelings of uncertainty and powerlessness. This indicates once more how important it is for authorities to conduct a social impact assessment, on each planned intervention.

## 7. Reflection

The events occurring in the Groningen area, the human-made earthquakes, the whole reinforcement program, and especially the size of the reinforcement project in Opwierde-Zuid, are unique. Although literature exists on the social impact of disasters on communities and forced movement, none of them captures the context of Opwierde-Zuid. Therefore, it remains difficult to link all the data to the theoretical framework, as some of the results can only be discussed within this context.

Due to the many events regarding the earthquake matters in the politics and the reinforcement project Opwierde-Zuid (see timeline), it remains difficult to present a clear overview of the current situation in Opwierde-Zuid. During the time of interviewing, the plans of the project 'purchased housing reinforcement' changed, which resulted in the last interview, with Noortje, turning out differently than expected. Despite discussing her view on the former plans of the 'purchased housing reinforcement' plans, her knowledge about the newly announced housing plans and her positive attitude towards this, could have resulted in different answers during the interview.

This research focused on three projects within the reinforcement project Opwierde-Zuid. During this study, I came to the conclusion that all three projects are a lot different, and that my focus became too broad. Not only the projects were different, this research also focused on both homeowners and tenants. Despite the experiences of these participants creating a broad overview of the social impacts that occur in Opwierde-Zuid, focussing on just one project or group of inhabitants would have created a clearer focus. In this way, the link between the participant and a project would have been easier to perceive. Additionally, more participants of the same project could have been interviewed, which would have resulted in more data to compare.

Only a small number of residents were interviewed. The idea behind this research was not to generalise the outcome of the data, as this number is too small to portray an overview of all residents living in Opwierde-Zuid. However, the outcome of this research can tell us that these social impacts, described in the results and conclusion, occur in Opwierde-Zuid at the moment. I recommend that, in further research in Opwierde-Zuid, or in other reinforced neighbourhoods, more residents will be interviewed, to make sure that the data becomes more generalizable.

I also suggest more research on the experiences of residents living in reinforced houses, as this research did not include this group. It would be interesting to quantify the social impacts that this group experiences and if these social impacts are similar to the result of this research.

The NCG and housing corporation Marenland provide almost no information regarding the reinforcement project in Opwierde-Zuid. This made it difficult and time-consuming to get a comprehensive overview of the three different projects. Also, the NAM, housing corporation Marenland and the government do not publish any data about costs concerning the reinforcement project in Opwierde-Zuid, as well as on the delay of the project 'rental housing reinforcement'. Therefore it is difficult to determine the exact costs. Eventually, the media and the participants have provided most of the information needed for this research.

The media already portrayed an overview of some of the social impacts that occurred in Opwierde-Zuid. However, during this research, the social impacts are much larger and more intensely experienced by the residents than I expected beforehand. Before conducting the interviews, the main focus was on the residents' sense of home and the possible changes of this throughout the reinforcement project. However, to give a clear and comprehensive overview of the full impact in

Opwierde-Zuid, the focus within this research has become broader, as more aspects regarding the reinforcement seem to be important, such as emotional impacts and actions of authorities.

## 8. Personal recommendation

We can conclude that, if authorities had conducted a social impact assessment before the reinforcement project in Opwierde-Zuid started, it would have prevented, or at least reduced, some of the negative social impacts of the project on the residents. They were not involved in the decision-making process, creating a lot of uncertainty, and reduced support for the reinforcement project in general. The participants of this research touched on many aspects that, in their view, did not go well since the reinforcement project was announced. Therefore, it is important to stress the benefits of conducting a social impact assessment before the start of similar reinforcement projects in the Groningen area. It is important to create support from residents, as a project like this touches them right in their living environment; their home. Without the residents' support, and without reducing their feelings of uncertainty and helplessness, projects will become impossible to execute, as is currently happening in Opwierde-Zuid. Rather than just consulting residents about reinforcement plans, authorities should start creating them in cooperation with the residents. By involving residents and taking their concerns and wishes into account, the risk of negative impacts can be reduced.

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## Appendix 1: Interview Guide

### Background information

Name (or pseudonym):

Gender:

Age:

Household:

### Algemene vragen

1. Woont u in een koopwoning of huurhuis?
2. Woont u in een gemetselde woning of in een vliesgevelwoning?
3. Wanneer bent u in uw woning komen wonen?
4. Woonde u voor deze woning ook in Appingedam?
  - Waar in Appingedam of waar anders?

### Woning vragen

5. Wat zijn de plannen voor uw woning?
6. Hoe tevreden bent u met de plannen voor uw nieuwe woning?
7. Wat voor een schade heeft u tot nu toe aan uw huis ondervonden door de aardbevingen?
8. Hoe tevreden bent u met uw huidige woning?
9. Hoe gaat u om met de veranderingen die in uw woning zullen plaatsvinden?
10. Hoe ervaart u het idee van in een tijdelijke accommodatie te moeten verblijven?

### Gevoel van thuis

11. Wat betekent uw huis voor u?
12. Hoe verbonden voelt u zich met de plek waar u woont?
13. Is uw gevoel van thuis verandert gedurende het versterkingsproject?
14. In hoeverre heeft u zich onveilig gevoeld of voelt u zich onveilig in uw eigen huis?
  - Is dit gerelateerd aan de aardbevingen?

### Aardbeving kwestie

15. Hoe regelmatig voelt u een aardbeving en wat doet dat met u op dat moment?
16. Wat voor een economische impacten hebben de aardbevingen op uw leven tot nu toe gehad?
17. Heeft u ook psychologische klachten ondervonden door de aardbevingen? Zo ja, welke psychologische klachten?
  - Zijn deze ontstaan voordat het versterkingsproject is begonnen of heeft het versterkingsproject hier ook een rol in gespeeld?
18. Wat voor een effect heeft het versterkingsproject op uw relatie met de mensen om u heen?

### Woonwijk vragen

19. Op wat voor een manier speelt de buurt een rol in uw leven?
20. Hoe ervaart u de sfeer binnen de wijk op dit moment?
  - In hoeverre is deze sfeer verandert/hetzelfde gebleven gedurende het versterkingsproject?

21. Wat vindt u van de plannen over de toekomst van de wijk?
  - Ervaart u dit als positief of negatief ten opzichte van voor de versterkingsproject?
22. Hoe ziet u zelf de toekomst van de wijk?

#### **Project vragen**

23. In hoeverre vindt u dat u goed op de hoogte bent gehouden over het project zelf?
24. In hoeverre vindt u dat uw stem/mening is gehoord in de plannen/uitvoer van het versterkingsproject?
25. In hoeverre vindt u dat de overheid op tijd heeft gereageerd met het versterken van de huizen?

#### **Afsluitende vragen**

26. Hoe voelt u zich na een (half/uur) over dit onderwerp te hebben gesproken?
27. Zijn er nog dingen die nog niet besproken zijn, maar u nog wel kwijt wilt?