

High-density, Low-rise – a challenge for Dwelling Landscapes in the Netherlands Architectural Research by Design as a process towards incorporated typologies

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Abstract

In the Netherlands, the topics of ‘cluttering’ of the landscape and ‘compact city’ at present guide the search for alternatives to suburban residential areas, which have taken too much space of open land. This paper discusses the very important issue of finding ways to comply with our growing need for urban, high-quality housing environments, meanwhile allowing us to preserve green land and landscapes. Can architects, landscape architects and urban designers secure the landscape to become a main ingredient in their urban densification plans, thus respecting the existing city boundaries and create viable living environments that allow children enough space to explore their free world? We focus on the qualities of a specific typology of dwelling architecture – High-density, Low-rise – as favoured by the city of Groningen by means of their *Intense Laagbouw* campaign (2008-2009).

We describe the *Green Dice proposal for intense small-scale housing* by Jarmund Vignæs Arkitekter (JVA, Oslo) as a project-transcending housing scheme, which allows the landscape to become part of the residential. Moreover, we utilize their approach to this typology-based design assignment to address the topic of Research by Design. A focus on scientific support to project-defining concepts allows architecture to take position where the design – applied as a tool in a research process – is made to a necessary partner for all supporting disciplines, that are instrumental in this process. This Research by Design approach ensures that both ‘the building’ and ‘the urban plan’ contribute to a liveable society.

Density as a challenge

The habitable space per individual in the Netherlands has increased twelve-fold since 1900: half the number of people live in dwellings, three times the size, on plots, double the size (Uytenhaak, 2008, p.17). Lack of space and financially driven motives have led to an increasing building density in cities, whereas housing programs continuously demand more dwellings per hectare. City densification requires new housing typologies, whereas the reduction of the amount of private outdoor space is compensated by greater privacy in the dwelling itself, and by new forms of space between the dwellings.

Suburbia by now has taken away too much space of open land, with a typological monotony, which remains hidden behind multilingual architectural facades. Especially the vast mono-functional urban residential city extensions known as *Vinex*¹ districts finally made us realize that we should reconsider the way we organize the use of our land. To extend our urban territory and at the same time lower the pressure on the outlying land, we should return to pre-existing city grounds.

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Hence, how do we benefit from the available space within the city boundaries? Consequently, the importance of the attention for sharp borders between city and landscape lies in the quality of the urban and public space itself, claims Niek Verdonk, then City Architect of Groningen and initiator of the *Intense Laagbouw*² campaign (Dorsman et al., 2009, p.11).

Can architects, landscape architects and urban designers secure the landscape to become a main ingredient in their urban densification plans, thus respecting the existing city boundaries and create viable living environments that allow children enough space to explore their free world?³

Outline

Our exploration of the high-density, low-rise typology starts by setting out the Groningen project *Intense Laagbouw* and the topic of research by design in their reciprocity. As of then, we will concentrate on this typology, which deserves to regain its importance to current and future urban developments in the North-Western European context, by recalling Dutch and Danish precedents from the 20th century. High-density, low-rise typologies accomplish this aim by limited upward development. Moreover, they display a mixture of functions, although to a lesser extent than the *Intense Stad* campaign (2003-2004) in Groningen asked for.⁴ The intensity of the low-rise city primarily lies in the close-packing of dwellings, where the notion of proximity of amenities and issues of access in particular ensure intensification of the transitions between public, collective and private spaces.

The key question in the research by design assignment of the *Intense Laagbouw* campaign was as follows: “Is it possible to build high-density, low-rise in the existing city (excluding any urban expansion for the time being), i.e. in densities which approach those of high- and medium-rise construction? And does this result in a living environment that ties in with a much-cherished desire of many, namely a house with a garden, directly accessible from ground level, with or without a private outdoor space on the roof (Van Gameren, Kuitenbrouwer, Schweigman and Verdonk, 2009, p.23)?” In other words: high-density, low-rise implies that every dwelling should be accessible from – a sometimes elevated and thus ‘new’ – ground level.

With their proposition entitled *Green Dice: A proposal for intense small-scale housing* Jarmund/Vigsnæs Arkitekter (JVA, Oslo) have paid particular attention to the challenging aspect of research by design, which in turn serves as a case study to demonstrate this approach and the promise this project holds for a new type of ‘dwelling landscape’, being an integral part of urban design. By applying the method of decomposition⁵, the architects offer us five project-defining concepts; some are intrinsic (project-specific), other are generic (project-transcending). Thus we reflect on the implementation of these concepts by JVA, and evaluate which of them are project-transcending and could help interpret the typology of high-density, low-rise as a generic green hierarchy concept.

The Groningen Projects as a topic of Research by Design

The *Intense Stad* campaign in Groningen dealt with functional densification of the compact city, both in horizontal and vertical modes. Its aim was to secure the accessibility of the city by bicycle and public transport so to maintain the level of amenities (both commercial, such as retail, and non-commercial, such as schools) available to city dwellers. *Intense Laagbouw*

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continued this mission. Notably, *Intense Laagbouw* was aimed at looking for habitable space suitable for families with children in the existing city – that is increasingly the domain for single households (the old and the young, the rich and the poor). Families are usually condemned to live in Suburbia, and the city of Groningen sought to provide them with an alternative. If we consider the harvest of *Intense Laagbouw*, aiming to densify the existing city with respect for the outlying land, seen from a Dutch perspective one could speak of a true rediscovery of high-density, low-rise typologies.⁶

Research by Design

Whereas the aspect of typology – as it is present in the allocation of the *Intense Laagbouw* campaign in Groningen – becomes part of the research, the challenge of a basic rethinking of both the process of architectural design and the process of building adds an extra dimension to the ambition of the project. The result of such a project is a building or an urban layout in which supportive disciplines are ‘hidden’ as ‘invisible layers’, as they seem to be mere ‘construction lines’, erased at the time the final drawings should be presented. In this respect we call supporting disciplines, that are instrumental in this process: the incorporation of social data, economical feasibility, mobility desires, technical detailing, all aspects of heating, electricity, ecology and so forth, in the design stage.

In current discussions about architectural and urban projects, the aspect of scientific support is incorporated in the total design process as a logical part. To gain a better understanding of this research aspect of design, Jørgen Hauberg provides us with illuminating insights. According to Hauberg (2011, p.46), “research is ‘coloured’ by traditions and professions, and research in architecture should be coloured too, taking into consideration that the practice of architects stretches from natural science and sociology to art and that the most important way in which the architect achieves new cognition is through work with form and space – drawings, models and completed works”.⁷ Thomsen and Tamke (2009, cited in Hauberg, 2011, p.50) define design as “the means by which the architect poses a question and develops complex solutions. It is a reflective practice in which critical assessment, comparability and evaluation takes place through sketching, through the continual weaving between problem and solution in an iterative movement between inquiry and proposal”. Hauberg (2011, p.52) adds that “through research by design, concordance is sought between the methods of research and a form-giving, experimental design practice. Research by design is research that produces knowledge through the architect’s tools and working methods. It investigates the research inquiry from the practitioner’s methods and acknowledges practice as a mean of gaining new knowledge”.

What happens at the time the design becomes a catalyst again, in such a way that it can challenge the aforementioned supporting disciplines? Similarly, in this stage of the design process, what would happen in case of this merging aspect of design becoming an essential part, i.e. a decisive step towards a challenging building process in which ambitions or strategies are realized on different levels? We call typological innovation, or the way the design works as a catalyst for the development of a sheer liveable environment. Initiated by an urbanistic ambition research should lead to a first step in exploring an architectural deepening, which in turn should lead to a supporting urbanistic elaboration. That again can raise the architecture to a next level of sustainability, and can we reach our point of departure: urbanistic ambition – architectural review – urban tightening and correction – architectural confirmation.

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High-density Low-rise – an antithesis?

From history, architects and urbanists have learned how the English *Garden City Movement* between 1880 and 1910 developed compact dwelling typologies and clusters of dwellings related to the open landscape. Although necessarily much denser compared to this precedent of more than a century ago, recent developments in the Netherlands, such as the Groningen initiative to research high-density, low-rise typologies, have highlighted the urge for a scenic quality at the dweller's disposal in the immediate vicinity of – and available directly in between – their dwellings. Furthermore, proposals with patio schemes, possibly clustered in mats and accessed from second or even third ground levels, can be found among the entries for the *Intense Laagbouw* campaign. These examples explore typologies that lead us back to the works by Jaap Bakema, Aldo van Eyck and Piet Blom, which already came into fashion in the 1950s, 1960s and 1970s to give way to both cars and pedestrians.

Danish examples from the 1960s and 1970s demonstrate densified mat structures, such as in Nivå (Åtoften, 1966 and Nivåvænge, 1976) – at that time creating a safe haven for families and their children in a kasbah-inspired pattern of clustered patio dwellings, streets, alleyways, small squares and a green common with plenty of room for children to play, separated from cars and outsiders. Imagine such a structure being crossed with the three- and four-storeyed terraced housing of Farum Midtpunkt (1970-1974), a dense urban quarter, raised above grade with a parking garage beneath the entire building scheme.

Another important source for inspiration of scenic green dwelling qualities can be found in the Scandinavian tradition which is especially sound and functional because, as stated Kay Fisker, “It isn't pretentious and flamboyant as in the Latin countries, Monumentality is not a goal in itself. We strive after an architecture that serves people, which conforms to nature and isn't intrusive, on the contrary: tries to be anonymous” (Lund, 1985, p.12). Søndergårdsparken (Bagsværd, 1950), low-density and low-rise, is typical of what Kay Fisker called the “Functional Tradition.” Søndergårdsparken demonstrates this tradition as being characterized by a harmony of functional usage and refined detailing: between function and form. Nils-Ole Lund put it like this: “As far as utility is concerned, it is considered synonymous with social engagement and with the attitude that architecture is comprised of the total milieu, including the surroundings and not just symbolic buildings” (Ibid., p.12).



1 Piet Blom, Kasbah, Hengelo, 1974. 2 Alstrup & Villefrance, Åtoften, Nivå, 1966. 3 Fællestegnestuen, Farum Midtpunkt, 1974.



4 Povel Ernst Hoff & Bennet Windinge with Aksel Andersen, Søndergårdsparken, Bagsværd, 1950 - *fælleshave* [green common].

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Green Dice: a proposal for intense small-scale housing

As one out of three competitors, Oslo-based architects Einar Jarmund and Håkon Vignæs were assigned to make a draft proposal for the difficult, remote, post-industrial *Gembeton* site to the northwest of the city centre of Groningen, hemmed in between the traffic noise of the *Friesestraatweg* motorway and the *Reitdiep* waterway. With their *Green Dice: a proposal for intense small-scale housing*, JVA succeeded to transform this 10,000 m² rather generic site.⁸

In a question and answer with the authors, architects Einar Jarmund and Håkon Vignæs appeared to be very impressed by the relationship of quality and cost they found in Dutch housing – a great inspiration for their scheme – and the obligation for the city of Groningen to provide good, affordable housing. They still well remember Niek Verdonk saying (and quote him often) “that the city, in order to do what they can to keep cost of housing low, has to catch up with the best brains of Europe.”⁹ JVA like working within strictly limited means. While designing and constructing the Oslo School of Architecture (AHO), JVA infused their concept with intelligence, not with costly solutions.

JVA's *Green Dice* proposal is definitely thought of as a generic proposal of intimate, high-density housing, adjusted to the site-specific situation of light, noise, etc. claim the architects. Each dwelling unit creates living qualities with dense solutions, flexible floor plans, parking beneath the dwelling clusters and an optimized relationship between inside and outside.¹⁰ On their home page the architects state that “each individual dwelling is readable as a separate entity, as well as part of a whole. The structure is simple and rational for optimizing the relationship between value and cost. The project is characterized by creating a hierarchy of outside spaces, which is clearly defined by public and private areas, utilising storage shelters and fences, resulting in a rich spatial environment still easy to orientate yourself within. The units have generous private outside living rooms, on the ground for some units, on the roof for some, closely connected to the main inner room with removable folding doors.”¹¹

Along the waterside meanders a non-stop cycling route, as well as a splendid mixture of collective and private space between the blocks. Relaxed simplicity is the appropriate term here, embodying the intimacy and an irregular, labyrinth-like quality JVA claim to recover from historical Dutch cities. Initially, by ‘throwing dices’, they opted for a quite irrational, romantic approach. Yet, JVA were encouraged to edit their proposal to a more reasoned solution: the irrational made rational through optimization of sunlight, view, privacy, etc. Although the introduction of a ‘footpath’ by projecting gardens on top of the roof of one’s neighbour gave rise to questions concerning one’s own privacy and ownership, this feature remains a daring ingredient as to experience this dwelling landscape from within.

Due to the transition from the hermetically sealed dwelling-wall-cum-noise-barrier on the motorway to a very open configuration of compact wooden urban dwelling clusters, all of which are oriented to the waterside, every dwelling has its own outdoor space. This produces a – mostly – covered public parking area between the foremost dwellings on the waterside and the commercial spaces and storages on the motorway.¹² On the one hand, by doing without mechanical ventilation for the car park, JVA managed to achieve substantial savings. On the other hand, they provided for a greater three-dimensionality of the project through the openings towards the car park between the dwelling volumes, allowing for an enhanced experience within the car park.

A closer study of JVA's proposition reveals a working method that balances coincidence (‘throwing dices’), experience, designer's guts and clever cost-cutting into the incorporated typology of high-dense, low-rise.

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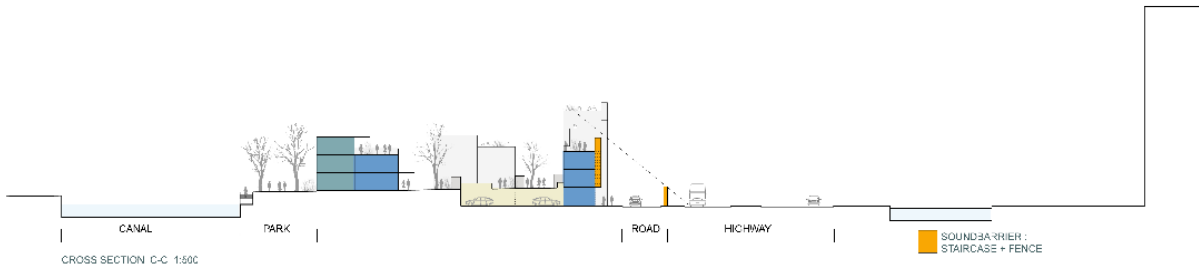
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5 Intense Laagbouw. Woningbouw in hoge dichtheden [High-Density, Low-Rise. Dwelling in high densities], Groningen, 2009
 6-7 The elevated ground floor plan (6) and extended cross section C-C (7) show the transition from the hermetically sealed dwelling-wall-cum-noise-barrier on the motorway to the very open configuration of compact wooden urban dwelling clusters, all of which are oriented to the waterside.



8-9 Cross sections C-C, D-D: smart covered public parking area (8), infused with daylight between dwellings and gardens (9).



10 Smart floor plan typologies: interlinked dwellings.



11 JVA allow the landscape to become part of the residential.

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Green Dice decomposed

Within the offered suburban condition of their exemplary study project for the city of Groningen, JVA understood the challenge of the reading of the Dutch Landscape by bringing forward 'repetition' and 'layered landscape' as key concepts, being of a generic (project-transcending) nature, as is the concept of a 'sustainable living environment'. Furthermore, the intrinsic (project-specific) concepts of 'smart floor plan typologies' and 'textile materialization', define the project. These concepts being implicitly present in their design, JVA demonstrate both on generic as site-specific levels that a high density-rate in a low-rise urban fabric allows the landscape to become part of the residential, thus proving density as a challenge relevant to the intended purpose of *Intense Laagbouw* to build in densities which approach those of high- and medium-rise construction,¹³ and ensuring that every home is actually accessible from (a sometimes elevated and thus 'new') ground level.

- the concept of 'repetition' – generic (project-transcending)

Through repetition of the basic unit the qualities of both the project-defining function (dwelling) and the landscape (a green hierarchy of dwellings and their outside spaces, and the public green space in between) become visible. The basic unit is the interlinked dwelling with ground floor access by a private ground floor pocket garden, laid out in manifold configurations. The repetition of these basic units – as an organizing principle – articulates the capacity of equality between the participants (the individual dwellers) yet in addition pays attention to the concept of 'living together'.

The northern, southern and western borders of the proposed scheme become existential elements in the durable organisation of the whole: they bound the community. The fourth – eastern – border acts as two parallel realities: soft as the dwelling landscape appears by the repetition of clusters of dwelling units, which leaves space between them, and clear, i.e. bound by the waterway. Thus the repetition is more than the sum of its parts. An equilibrium arises between the environment and the way how, through repetition, a proposal can be discovered in which open and closed parts in turn create a new condition in which private and public can be brought together in a balanced way.

- the concept of the 'layered landscape' – generic

The dwelling landscape is described by its section and seemingly conceived as being based on the artificiality of most Dutch water and land, that has been raised accordingly above the existing water and street levels, thus allowing a smart covered car park solution, infused with daylight between dwellings and the 'new ground floor' gardens. Seen from the waterside, a cascade of dwelling volumes gives the impression of a layered 'landscape of dwellings'. Every dwelling, part of an extremely simple volume, repeated both horizontally and vertically to create a multitude of readings, layers and changing views, both shelters – resulting in an intimacy – as exposes itself towards its neighbours and fellow city dwellers alike.

- the concept of a 'sustainable living environment' – generic

Compact volumes (floor plans of 6 to 7 m, ranging in height from two to three-storeyed houses) with a minimal external surface, a well-insulated structure with high-quality windows orientated for optimal gain of solar heat, solar exposure for all units, both for the interiors and for the outdoor spaces, compact plans that make a central heating source usable and sustainable use of materials underscore the aim for a long lasting sustainable quality of JVA's proposition.

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- the concept of 'smart floor plan typologies' – intrinsic (project-specific)

The scheme repeats three times two wedge-shaped clusters (each with seven volumes) of interlinked dwellings, directly accessible from ground level. They consist of a ground floor pocket garden, three floors of habitable space (126 m², three to five bedrooms) plus a roof garden ('outdoor living room') on top of the interlinked second floor volume (84 m², three bedrooms) that adds to the 40 m² ground floor pocket garden. Thus, narrow North-South and wider, irregular diagonal pedestrian-only passageways from the two to four-storeyed barrier on the west side, slightly resolving to the lower canal-facing park, allow for views and accession of sunlight to all dwellings. The open – and therefore flexible – floorplans include the possibility of a second living room or playroom on bedroom level.

The barrier along the busy motorway consists of a plinth for commercial use (sometimes connected to dwelling units stacked on top) and drive-in car parks where two or three- to four-storeyed dwelling types (120 m²) and generous roof gardens as private outdoor living rooms (35 m²) are stacked, protected from traffic noise and blessed with good sunlight conditions. Stairs and a fence between service road and motorway are used as a double sound barrier, allowing for light to penetrate through two layers of glass that shut out the traffic noise. In total the whole plot of 76 dwellings consist of four dwelling types only. In short: JVA provided for a simple and rational structure that optimizes the relationship between value and cost.

- the concept of 'textile materialization' – intrinsic

Facades are developed with textile qualities made with sustainable brick and wood and reflect the general geometrical strategy for the whole proposal. Brick might be used towards the motorway as a sound barrier with an equal pattern to the wooden siding. Acoustic wooden panels, applied to the long facade that faces the motorway, prevent reflection of traffic noise into the area.

The high-density, small-scale housing project by JVA in Groningen shows how a balanced solution can be given to the challenge of an urban densification, while paying attention to the way shared in-between-space, private and public, landscape and built environment, infrastructure and accessibility can be merged into a blueprint for similar assignments that enhance great spatial and typological qualities, both on generic and site-specific levels. Nevertheless, we notice that as a draft proposal¹⁴, *Green Dice* remains a collection of dwellings rather than a real neighbourhood, since in this study project – apart from the projected commercial space in the plinth along the motorway – amenities such as a school and local supply are lacking. Therefore *Green Dice* cannot catch up yet with the walkable dense and diverse city everybody seems to talk about in the current debate, where people do not need a car to handle their daily routine, since all they need is nearby. Hence, in order to form a sustainable, actual neighbourhood, an urbanistic supporting elaboration should provide a 'catalyst'.

Yet, should we consider the concept of high-density low-rise to be something other than inner-city sprawl? Sprawl is always seen from the built object: the spread of the buildings between which the empty space, as it were, is regarded as a 'non-space', being the result of an act of building. But could it not be reversed? Can we not view sprawl from the open space, and thus, can in one way or another the entirety of 'empty spaces' make an innovative unity? An example of this at neighbourhood level is the urban ensemble Spaarndammerbuurt in Amsterdam, as described by Reijndorp¹⁵, where different forms of courtyards appear that can give rise to a walk in an urban setting.

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Dwelling Landscapes composed

By designing high-density, low-rise communities in the existing city architects can test and amend the adapted concepts, as Einar Jarmund and Håkon Vignsnes did with the concepts of 'repetition' and 'layered landscape' in their prototypical *Green Dice* proposal. They even sharpened these concepts in their ambition to create a new type of 'dwelling landscape' being an integral part of urban design. These dwelling landscapes carry the potential of reassessing the *as found* ecological and (sub)urban conditions of any given site. Thus the architects aim for a truly sustainable urban fabric, setting the stage for an urban culture.

Identity of place as a challenge for the Dutch Landscape

In *Green Dice*, a new 'framed landscape' stands out, appointing the values of 'compact city' and 'outlying land' in terms of 'city' and 'landscape'. Both can be defined as archetypes, which means that, within their typology, they are the bearers of an identity, in this case an identity of place. And this is a challenge, especially for the Dutch Landscape. Here, the flatness of the landscape is typical of the Earth's seemingly endless surface, that can be envisaged beyond the border of the horizon. Yet, this unlimited nature of the landscape has been bounded by the concept of densification. Man decided not to extend over the border of the horizon but to create a defined and limited place. In this way the process of densification challenges the identity of this typically Dutch – i.e. flat – landscape and defines 'city' as a bordered place, vitalizing the archetype of the city or 'town' as etymologically related to the German 'Zaun' or 'fence' which gives meaning to the recognition of the border as a spatial limitation. It seems as if JVA's *Green Dice* was a very suitable match of landscape-related architecture to this reading of the Dutch Landscape, even if it is much more fragmented than the surrounding landscape itself.

By exposing the most defining underlying concepts of 'repetition' and 'layered landscape', this exemplary project demonstrates that the various aspects of research by design as conducted by architects deserve to be presented as stand-alone projects, whereas in most cases, the results of an architectural process are shown by presenting mere buildings – as finished objects. Moreover, a focus on scientific support to project-defining concepts allows architecture to take position where the design – in the service of a research process – is made to a necessary partner for all supporting disciplines, that are instrumental in this process. This Research by Design approach ensures that both 'the building' and 'the urban plan' contribute to a liveable society.

Coda

In urban areas, High-density, Low-rise typologies allow for adding dwellings to the existing pattern and silhouette of the city without necessarily changing them. High-density, Low-rise provides a favourable typology for housing, being directly accessible from ground level, in an urban context, based on optimal land use. Density is not an end in itself and is not an absolute rate on which city planning should be based. A conscious understanding of high density should strive to keep our cities alive, both spatially and programmatically. Hence, a high density in a low-rise building typology should allow the landscape to become part of the residential.

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NOTES

¹ The term *Vinex* is an acronym of *Vierde Nota Ruimtelijke Ordening Extra* [Fourth Report on Spatial Planning Extra], i.e. a policy briefing note of the Dutch Ministry of Housing, Spatial Planning and Environment, released in 1988, aiming for Dutch housing production in the period 1995-2004.

² *Intense Laagbouw* [High-Density, Low-Rise, 2008-2009] was a joint research-by-design project, executed by the City of Groningen (then City Architect Niek Verdonk et al.), TU Delft Faculty of Architecture and the Built Environment (chair of Architecture and Dwelling, professor Dick van Gameren and assistant professor Paul Kuitenbrouwer: <http://www.tudelft-architecture.nl/chairs/dwelling/research/intense-laagbouw>) and 50 architects, designing 52 projects for 30 sites in Groningen, the northernmost 'compact city' in the Netherlands.

³ Exploring their free world is part of children's existential essence, i.e. the 'large world' has the obligation to disregard for a while the speculative 'importance' of the optimization of a plot and give children their freedom to play in a protected, and at the same time open world.

⁴ The campaign previous to *Intense Laagbouw* was entitled *De Intense Stad* [The Intense City, 2003-2004] and was conceived accordingly by the city of Groningen (Niek Verdonk et al.), inspired by curator Winy Maas (MVRDV) and executed by architects and clients, proposing 37 projects for Groningen, aiming for densification and mixed use of plots in the existing city.

⁵ or: 'parsing', akin to "resolve (a sentence) into its component parts and describe their syntactic roles", Oxford Dictionaries, 2015. [online] Available at: <<http://www.oxforddictionaries.com/definition/english/parse>> [Accessed 1 June 2015].

⁶ Within the framework of their high-density, low-rise campaign Niek Verdonk asked the chair of Architecture and Dwelling, Faculty of Architecture and the Built Environment, TU Delft (professor Dick van Gameren and assistant professor Paul Kuitenbrouwer) to produce an 'inspirational book' on the topic for architects and their clients: housing corporations, project developers and private investors alike. After its presentation to this group of professionals in the spring of 2008, the architects set sail and presented their design proposals in the spring of 2009. Subsequently, and accompanied by a publication, all schemes were exhibited, first in Groningen (July-August 2009) and later at the Ministry of Housing, Spatial Planning and the Environment in The Hague (January 2010).

⁷ In his article Hauberg (2011, p.50) further elaborates on research "as a broader field [that] includes experience other than that which is gained from science. Cognition is not the same as knowledge, and scientific cognition is not the only way in which we acquire new knowledge and insight. By far, most of our cognition is acquired physically by imitating or repeating, through actions and movements, by making mistakes, and feeling pain or pleasure. A fairly small part can be formulated as theory and can therefore be scientifically generalised. In essence, cognition and experience are of a personal nature, but they can also be objective and true. Conversely, theory, which is basically objective and true and often defined by time, is in the process of being replaced by a new theory. Research in Architecture is a part of all this, generally finding its requirements in the humanities tradition but not always doing this comfortably as the subject itself ranges from natural science and sociology to art and because the most important way in which the architect achieves new cognition is through work with form and space: drawings, models and completed works". Hauberg states that "the ambiguity of the drawing's theoretical potential and its role as a generalised and functional notation system maintain the special relation between reflection and creation – which is the method of architecture" (2011, p.49).

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⁸ *Green Dice* was previously published in: Dorsman et al., 2009, p.52-55; Kuitenbrouwer, P. and Saeger, R. De, 2011, pp.43-45, and Smith Wergeland, E., 2012, pp.14-17.

⁹ Jarmund, E., email to the authors, May 5, 2011.

¹⁰ Ibid.

¹¹ Jarmund Vignæs Arkitekter MNAL, 2015. [online] Available at: <<http://www.jva.no/projects/large/groeningen.aspx>> [Accessed 1 April 2015].

¹² ratio: 1.8 spaces per unit.

¹³ *Green Dice* achieves a density of 101 units/ha; gross FSI = 1,09; net FSI = 0, 62.

¹⁴ Even if economic circumstances have not allowed their design proposal to become realized, both JVA – by their research by design approach – and the city of Groningen – by the implementation of their *Intense Laagbouw* campaign – set a wonderful example in the field of high-density low-rise housing.

¹⁵ Reijndorp, A., 2015, *The return of the social; but not as we knew it*, keynote lecture, *Housing & Welfare - Boundaries|Encounters|Connections*, Copenhagen, Denmark, 7-8 May 2015.

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Since the *Norsk samtidsarkitektur 2000-2005* [Contemporary Norwegian Architecture 2000-2005] exhibition in Haarlem (NL) in the fall of 2009, Kuitenbrouwer and De Saeger have been working together in close contact with the Norwegian Embassies in Brussels and The Hague to enhance the bonds between the Low Countries and Norway.

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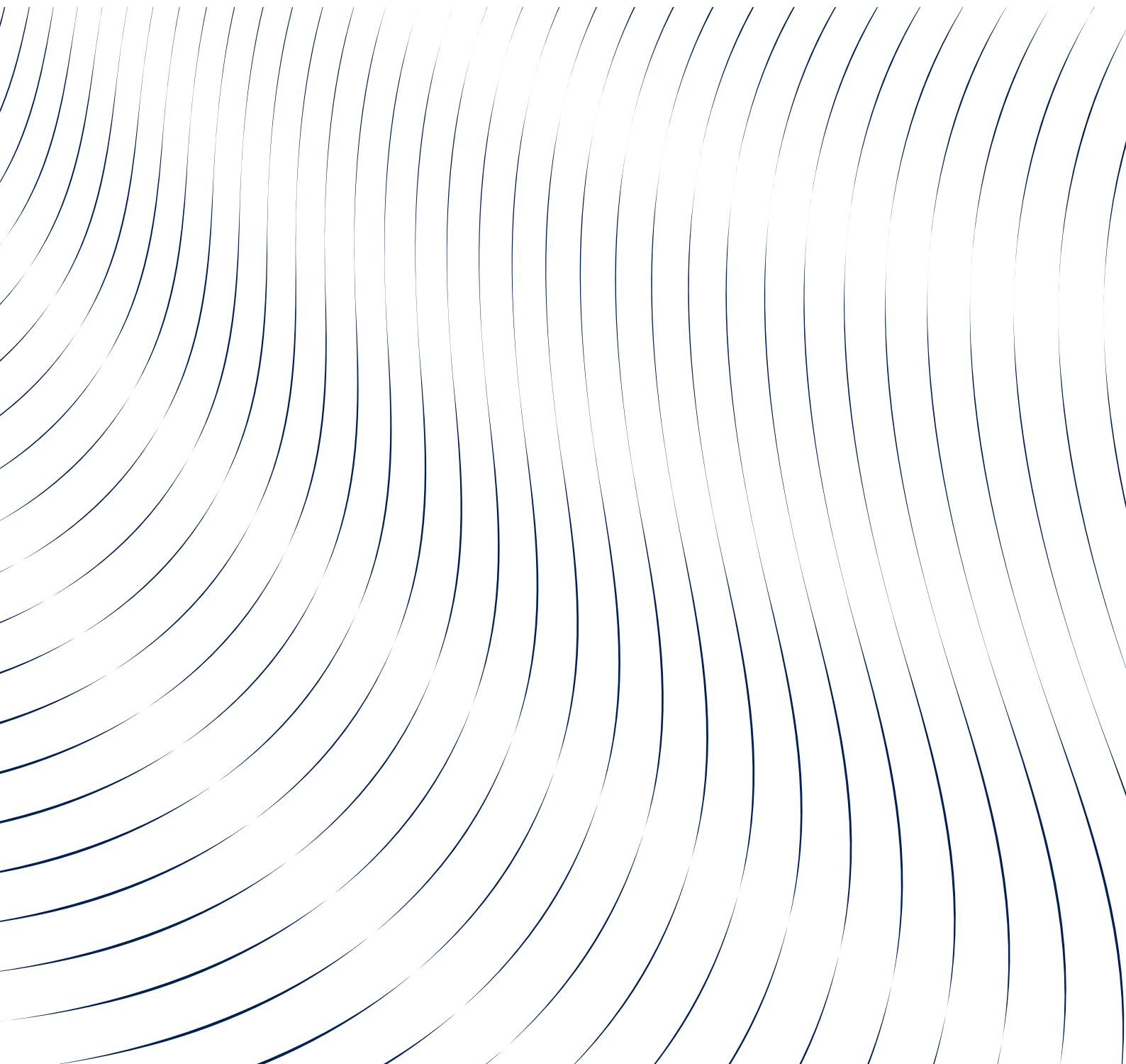
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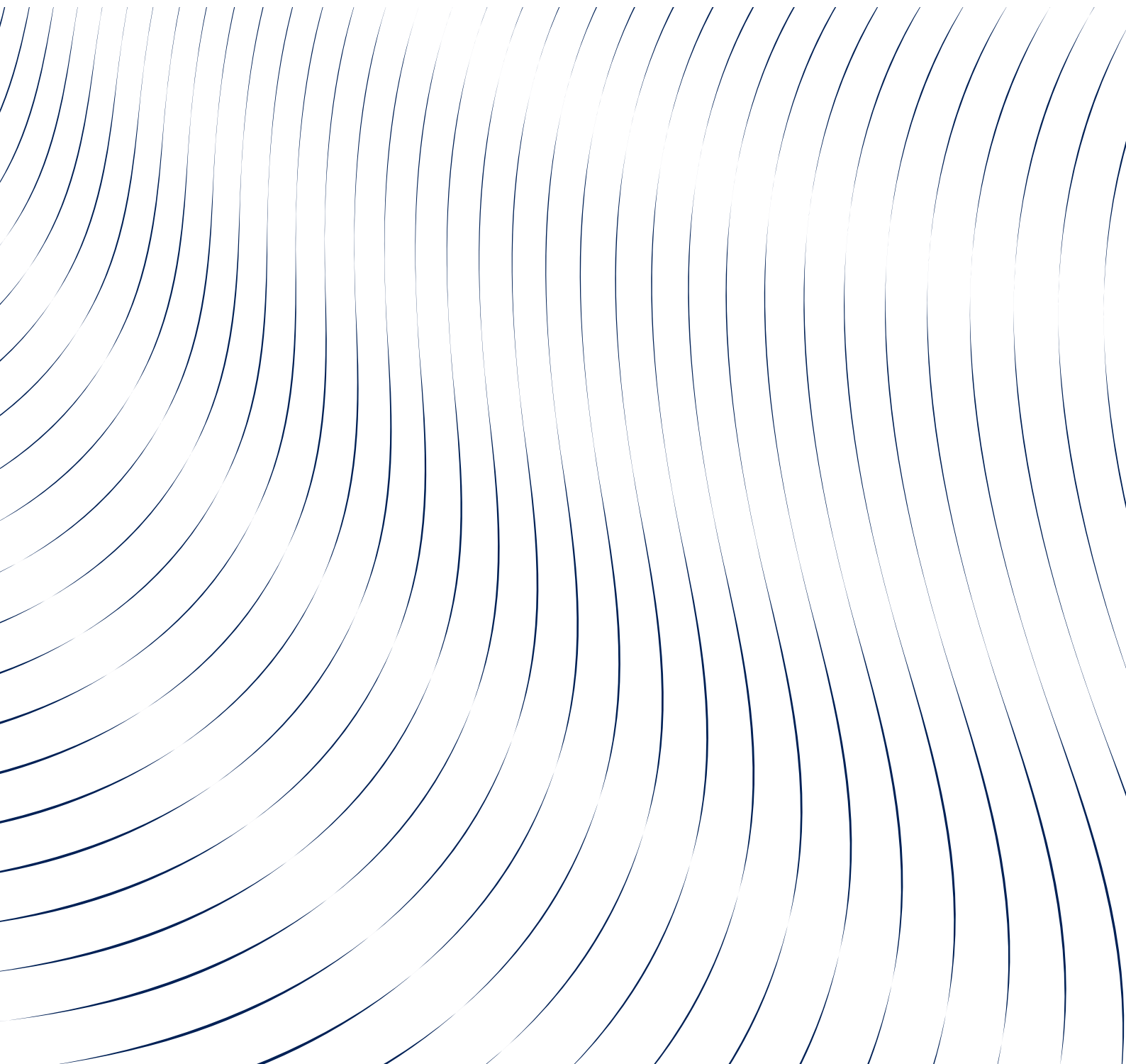




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Boundaries|Encounters|Connections

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Introduction

The Housing and Welfare conference and exhibition were held 7-9 May 2015 in Copenhagen, organised by the Danish Building Research Institute at Aalborg University Copenhagen in cooperation with the School of Architecture at the Royal Danish Academy of Fine Arts. The intention was to bring together professionals and academics across disciplines and countries to discuss urban and suburban developments. With a focus on housing and urban spaces, the intention of the conference and the exhibition was to examine the role of architecture and built environments in relation to the ongoing transformations of our societies.

The recent growth of many cities calls for a rethinking of urban and suburban development. How are suburbs and former industrial areas transformed to provide room for new citizens and functions? How do housing and urban space shape communities and everyday life? How can architecture and urban planning deal with current challenges like segregation, climate changes and ageing societies?

The exhibition focused on the future of Copenhagen; a city that – like many other cities – has been through innumerable changes, expansions and renewals. Different actors – the central and local governments, inter-governmental organisations, landlords, private developers and other private agencies – are now playing increasingly important roles in the development of housing and urban areas. They are not only decisive for modes and temporalities of urbanisation, but also introduce new logics and approaches that influence our everyday behaviour in Copenhagen.

The conference focused on boundaries, encounters and connections – between urban and suburban neighbourhoods, between new and old, between different social groups, between public and private actors, and between different disciplinary approaches to housing, suburbs and cities. During the conference, scholars and practitioners within housing and urban design discussed the present and future of urban and suburban development through keynotes, panels, dialogue sessions and workshops.

The papers presented at the workshops are published in these proceedings. The papers were all peer-reviewed in accordance with the definition stated by the Academic Committee of the Danish National Agency for Research and Innovation. The process was conducted as attributed peer reviews.

High-density, Low-rise – a challenge for Dwelling Landscapes in the Netherlands

Architectural Research by Design as a process towards incorporated typologies

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Abstract

In the Netherlands, the topics of ‘cluttering’ of the landscape and ‘compact city’ at present guide the search for alternatives to suburban residential areas, which have taken too much space of open land. This paper discusses the very important issue of finding ways to comply with our growing need for urban, high-quality housing environments, meanwhile allowing us to preserve green land and landscapes. Can architects, landscape architects and urban designers secure the landscape to become a main ingredient in their urban densification plans, thus respecting the existing city boundaries and create viable living environments that allow children enough space to explore their free world? We focus on the qualities of a specific typology of dwelling architecture – High-density, Low-rise – as favoured by the city of Groningen by means of their *Intense Laagbouw* campaign (2008-2009).

We describe the *Green Dice proposal for intense small-scale housing* by Jarmund Vignæs Arkitekter (JVA, Oslo) as a project-transcending housing scheme, which allows the landscape to become part of the residential. Moreover, we utilize their approach to this typology-based design assignment to address the topic of Research by Design. A focus on scientific support to project-defining concepts allows architecture to take position where the design – applied as a tool in a research process – is made to a necessary partner for all supporting disciplines, that are instrumental in this process. This Research by Design approach ensures that both ‘the building’ and ‘the urban plan’ contribute to a liveable society.

Density as a challenge

The habitable space per individual in the Netherlands has increased twelve-fold since 1900: half the number of people live in dwellings, three times the size, on plots, double the size (Uytenhaak, 2008, p.17). Lack of space and financially driven motives have led to an increasing building density in cities, whereas housing programs continuously demand more dwellings per hectare. City densification requires new housing typologies, whereas the reduction of the amount of private outdoor space is compensated by greater privacy in the dwelling itself, and by new forms of space between the dwellings.

Suburbia by now has taken away too much space of open land, with a typological monotony, which remains hidden behind multilingual architectural facades. Especially the vast mono-functional urban residential city extensions known as *Vinex*¹ districts finally made us realize that we should reconsider the way we organize the use of our land. To extend our urban territory and at the same time lower the pressure on the outlying land, we should return to pre-existing city grounds.

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Hence, how do we benefit from the available space within the city boundaries? Consequently, the importance of the attention for sharp borders between city and landscape lies in the quality of the urban and public space itself, claims Niek Verdonk, then City Architect of Groningen and initiator of the *Intense Laagbouw*² campaign (Dorsman et al., 2009, p.11).

Can architects, landscape architects and urban designers secure the landscape to become a main ingredient in their urban densification plans, thus respecting the existing city boundaries and create viable living environments that allow children enough space to explore their free world?³

Outline

Our exploration of the high-density, low-rise typology starts by setting out the Groningen project *Intense Laagbouw* and the topic of research by design in their reciprocity. As of then, we will concentrate on this typology, which deserves to regain its importance to current and future urban developments in the North-Western European context, by recalling Dutch and Danish precedents from the 20th century. High-density, low-rise typologies accomplish this aim by limited upward development. Moreover, they display a mixture of functions, although to a lesser extent than the *Intense Stad* campaign (2003-2004) in Groningen asked for.⁴ The intensity of the low-rise city primarily lies in the close-packing of dwellings, where the notion of proximity of amenities and issues of access in particular ensure intensification of the transitions between public, collective and private spaces.

The key question in the research by design assignment of the *Intense Laagbouw* campaign was as follows: “Is it possible to build high-density, low-rise in the existing city (excluding any urban expansion for the time being), i.e. in densities which approach those of high- and medium-rise construction? And does this result in a living environment that ties in with a much-cherished desire of many, namely a house with a garden, directly accessible from ground level, with or without a private outdoor space on the roof (Van Gameren, Kuitenbrouwer, Schweigman and Verdonk, 2009, p.23)?” In other words: high-density, low-rise implies that every dwelling should be accessible from – a sometimes elevated and thus ‘new’ – ground level.

With their proposition entitled *Green Dice: A proposal for intense small-scale housing* Jarmund/Vigsnæs Arkitekter (JVA, Oslo) have paid particular attention to the challenging aspect of research by design, which in turn serves as a case study to demonstrate this approach and the promise this project holds for a new type of ‘dwelling landscape’, being an integral part of urban design. By applying the method of decomposition⁵, the architects offer us five project-defining concepts; some are intrinsic (project-specific), other are generic (project-transcending). Thus we reflect on the implementation of these concepts by JVA, and evaluate which of them are project-transcending and could help interpret the typology of high-density, low-rise as a generic green hierarchy concept.

The Groningen Projects as a topic of Research by Design

The *Intense Stad* campaign in Groningen dealt with functional densification of the compact city, both in horizontal and vertical modes. Its aim was to secure the accessibility of the city by bicycle and public transport so to maintain the level of amenities (both commercial, such as retail, and non-commercial, such as schools) available to city dwellers. *Intense Laagbouw*

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continued this mission. Notably, *Intense Laagbouw* was aimed at looking for habitable space suitable for families with children in the existing city – that is increasingly the domain for single households (the old and the young, the rich and the poor). Families are usually condemned to live in Suburbia, and the city of Groningen sought to provide them with an alternative. If we consider the harvest of *Intense Laagbouw*, aiming to densify the existing city with respect for the outlying land, seen from a Dutch perspective one could speak of a true rediscovery of high-density, low-rise typologies.⁶

Research by Design

Whereas the aspect of typology – as it is present in the allocation of the *Intense Laagbouw* campaign in Groningen – becomes part of the research, the challenge of a basic rethinking of both the process of architectural design and the process of building adds an extra dimension to the ambition of the project. The result of such a project is a building or an urban layout in which supportive disciplines are ‘hidden’ as ‘invisible layers’, as they seem to be mere ‘construction lines’, erased at the time the final drawings should be presented. In this respect we call supporting disciplines, that are instrumental in this process: the incorporation of social data, economical feasibility, mobility desires, technical detailing, all aspects of heating, electricity, ecology and so forth, in the design stage.

In current discussions about architectural and urban projects, the aspect of scientific support is incorporated in the total design process as a logical part. To gain a better understanding of this research aspect of design, Jørgen Hauberg provides us with illuminating insights. According to Hauberg (2011, p.46), “research is ‘coloured’ by traditions and professions, and research in architecture should be coloured too, taking into consideration that the practice of architects stretches from natural science and sociology to art and that the most important way in which the architect achieves new cognition is through work with form and space – drawings, models and completed works”.⁷ Thomsen and Tamke (2009, cited in Hauberg, 2011, p.50) define design as “the means by which the architect poses a question and develops complex solutions. It is a reflective practice in which critical assessment, comparability and evaluation takes place through sketching, through the continual weaving between problem and solution in an iterative movement between inquiry and proposal”. Hauberg (2011, p.52) adds that “through research by design, concordance is sought between the methods of research and a form-giving, experimental design practice. Research by design is research that produces knowledge through the architect’s tools and working methods. It investigates the research inquiry from the practitioner’s methods and acknowledges practice as a mean of gaining new knowledge”.

What happens at the time the design becomes a catalyst again, in such a way that it can challenge the aforementioned supporting disciplines? Similarly, in this stage of the design process, what would happen in case of this merging aspect of design becoming an essential part, i.e. a decisive step towards a challenging building process in which ambitions or strategies are realized on different levels? We call typological innovation, or the way the design works as a catalyst for the development of a sheer liveable environment. Initiated by an urbanistic ambition research should lead to a first step in exploring an architectural deepening, which in turn should lead to a supporting urbanistic elaboration. That again can raise the architecture to a next level of sustainability, and can we reach our point of departure: urbanistic ambition – architectural review – urban tightening and correction – architectural confirmation.

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High-density Low-rise – an antithesis?

From history, architects and urbanists have learned how the English *Garden City Movement* between 1880 and 1910 developed compact dwelling typologies and clusters of dwellings related to the open landscape. Although necessarily much denser compared to this precedent of more than a century ago, recent developments in the Netherlands, such as the Groningen initiative to research high-density, low-rise typologies, have highlighted the urge for a scenic quality at the dweller's disposal in the immediate vicinity of – and available directly in between – their dwellings. Furthermore, proposals with patio schemes, possibly clustered in mats and accessed from second or even third ground levels, can be found among the entries for the *Intense Laagbouw* campaign. These examples explore typologies that lead us back to the works by Jaap Bakema, Aldo van Eyck and Piet Blom, which already came into fashion in the 1950s, 1960s and 1970s to give way to both cars and pedestrians.

Danish examples from the 1960s and 1970s demonstrate densified mat structures, such as in Nivå (Åtoften, 1966 and Nivåvænge, 1976) – at that time creating a safe haven for families and their children in a kasbah-inspired pattern of clustered patio dwellings, streets, alleyways, small squares and a green common with plenty of room for children to play, separated from cars and outsiders. Imagine such a structure being crossed with the three- and four-storeyed terraced housing of Farum Midtpunkt (1970-1974), a dense urban quarter, raised above grade with a parking garage beneath the entire building scheme.

Another important source for inspiration of scenic green dwelling qualities can be found in the Scandinavian tradition which is especially sound and functional because, as stated Kay Fisker, “It isn't pretentious and flamboyant as in the Latin countries, Monumentality is not a goal in itself. We strive after an architecture that serves people, which conforms to nature and isn't intrusive, on the contrary: tries to be anonymous” (Lund, 1985, p.12). Søndergårdsparken (Bagsværd, 1950), low-density and low-rise, is typical of what Kay Fisker called the “Functional Tradition.” Søndergårdsparken demonstrates this tradition as being characterized by a harmony of functional usage and refined detailing: between function and form. Nils-Ole Lund put it like this: “As far as utility is concerned, it is considered synonymous with social engagement and with the attitude that architecture is comprised of the total milieu, including the surroundings and not just symbolic buildings” (Ibid., p.12).



1 Piet Blom, Kasbah, Hengelo, 1974. 2 Alstrup & Villefrance, Åtoften, Nivå, 1966. 3 Fællestegnestuen, Farum Midtpunkt, 1974.



4 Povel Ernst Hoff & Bennet Windinge with Aksel Andersen, Søndergårdsparken, Bagsværd, 1950 - *fælleshave* [green common].

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Green Dice: a proposal for intense small-scale housing

As one out of three competitors, Oslo-based architects Einar Jarmund and Håkon Vignæs were assigned to make a draft proposal for the difficult, remote, post-industrial *Gembeton* site to the northwest of the city centre of Groningen, hemmed in between the traffic noise of the *Friesestraatweg* motorway and the *Reitdiep* waterway. With their *Green Dice: a proposal for intense small-scale housing*, JVA succeeded to transform this 10,000 m² rather generic site.⁸

In a question and answer with the authors, architects Einar Jarmund and Håkon Vignæs appeared to be very impressed by the relationship of quality and cost they found in Dutch housing – a great inspiration for their scheme – and the obligation for the city of Groningen to provide good, affordable housing. They still well remember Niek Verdonk saying (and quote him often) “that the city, in order to do what they can to keep cost of housing low, has to catch up with the best brains of Europe.”⁹ JVA like working within strictly limited means. While designing and constructing the Oslo School of Architecture (AHO), JVA infused their concept with intelligence, not with costly solutions.

JVA's *Green Dice* proposal is definitely thought of as a generic proposal of intimate, high-density housing, adjusted to the site-specific situation of light, noise, etc. claim the architects. Each dwelling unit creates living qualities with dense solutions, flexible floor plans, parking beneath the dwelling clusters and an optimized relationship between inside and outside.¹⁰ On their home page the architects state that “each individual dwelling is readable as a separate entity, as well as part of a whole. The structure is simple and rational for optimizing the relationship between value and cost. The project is characterized by creating a hierarchy of outside spaces, which is clearly defined by public and private areas, utilising storage shelters and fences, resulting in a rich spatial environment still easy to orientate yourself within. The units have generous private outside living rooms, on the ground for some units, on the roof for some, closely connected to the main inner room with removable folding doors.”¹¹

Along the waterside meanders a non-stop cycling route, as well as a splendid mixture of collective and private space between the blocks. Relaxed simplicity is the appropriate term here, embodying the intimacy and an irregular, labyrinth-like quality JVA claim to recover from historical Dutch cities. Initially, by ‘throwing dices’, they opted for a quite irrational, romantic approach. Yet, JVA were encouraged to edit their proposal to a more reasoned solution: the irrational made rational through optimization of sunlight, view, privacy, etc. Although the introduction of a ‘footpath’ by projecting gardens on top of the roof of one’s neighbour gave rise to questions concerning one’s own privacy and ownership, this feature remains a daring ingredient as to experience this dwelling landscape from within.

Due to the transition from the hermetically sealed dwelling-wall-cum-noise-barrier on the motorway to a very open configuration of compact wooden urban dwelling clusters, all of which are oriented to the waterside, every dwelling has its own outdoor space. This produces a – mostly – covered public parking area between the foremost dwellings on the waterside and the commercial spaces and storages on the motorway.¹² On the one hand, by doing without mechanical ventilation for the car park, JVA managed to achieve substantial savings. On the other hand, they provided for a greater three-dimensionality of the project through the openings towards the car park between the dwelling volumes, allowing for an enhanced experience within the car park.

A closer study of JVA's proposition reveals a working method that balances coincidence (‘throwing dices’), experience, designer's guts and clever cost-cutting into the incorporated typology of high-dense, low-rise.

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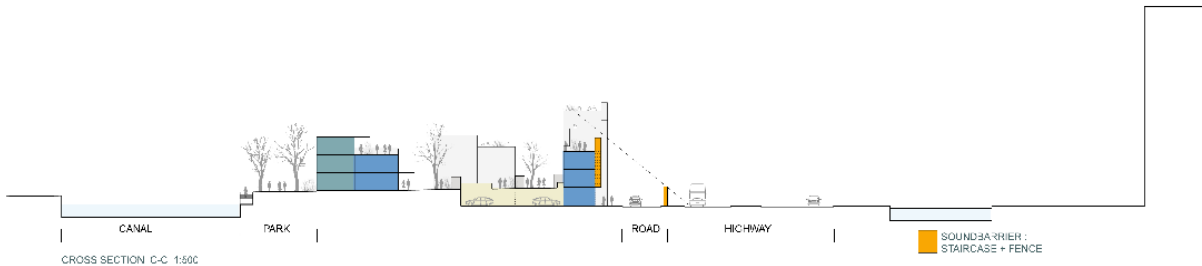
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5 Intense Laagbouw. Woningbouw in hoge dichtheden [High-Density, Low-Rise. Dwelling in high densities], Groningen, 2009
 6-7 The elevated ground floor plan (6) and extended cross section C-C (7) show the transition from the hermetically sealed dwelling-wall-cum-noise-barrier on the motorway to the very open configuration of compact wooden urban dwelling clusters, all of which are oriented to the waterside.



8-9 Cross sections C-C, D-D: smart covered public parking area (8), infused with daylight between dwellings and gardens (9).



10 Smart floor plan typologies: interlinked dwellings.



11 JVA allow the landscape to become part of the residential.

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Green Dice decomposed

Within the offered suburban condition of their exemplary study project for the city of Groningen, JVA understood the challenge of the reading of the Dutch Landscape by bringing forward 'repetition' and 'layered landscape' as key concepts, being of a generic (project-transcending) nature, as is the concept of a 'sustainable living environment'. Furthermore, the intrinsic (project-specific) concepts of 'smart floor plan typologies' and 'textile materialization', define the project. These concepts being implicitly present in their design, JVA demonstrate both on generic as site-specific levels that a high density-rate in a low-rise urban fabric allows the landscape to become part of the residential, thus proving density as a challenge relevant to the intended purpose of *Intense Laagbouw* to build in densities which approach those of high- and medium-rise construction,¹³ and ensuring that every home is actually accessible from (a sometimes elevated and thus 'new') ground level.

- the concept of 'repetition' – generic (project-transcending)

Through repetition of the basic unit the qualities of both the project-defining function (dwelling) and the landscape (a green hierarchy of dwellings and their outside spaces, and the public green space in between) become visible. The basic unit is the interlinked dwelling with ground floor access by a private ground floor pocket garden, laid out in manifold configurations. The repetition of these basic units – as an organizing principle – articulates the capacity of equality between the participants (the individual dwellers) yet in addition pays attention to the concept of 'living together'.

The northern, southern and western borders of the proposed scheme become existential elements in the durable organisation of the whole: they bound the community. The fourth – eastern – border acts as two parallel realities: soft as the dwelling landscape appears by the repetition of clusters of dwelling units, which leaves space between them, and clear, i.e. bound by the waterway. Thus the repetition is more than the sum of its parts. An equilibrium arises between the environment and the way how, through repetition, a proposal can be discovered in which open and closed parts in turn create a new condition in which private and public can be brought together in a balanced way.

- the concept of the 'layered landscape' – generic

The dwelling landscape is described by its section and seemingly conceived as being based on the artificiality of most Dutch water and land, that has been raised accordingly above the existing water and street levels, thus allowing a smart covered car park solution, infused with daylight between dwellings and the 'new ground floor' gardens. Seen from the waterside, a cascade of dwelling volumes gives the impression of a layered 'landscape of dwellings'. Every dwelling, part of an extremely simple volume, repeated both horizontally and vertically to create a multitude of readings, layers and changing views, both shelters – resulting in an intimacy – as exposes itself towards its neighbours and fellow city dwellers alike.

- the concept of a 'sustainable living environment' – generic

Compact volumes (floor plans of 6 to 7 m, ranging in height from two to three-storeyed houses) with a minimal external surface, a well-insulated structure with high-quality windows orientated for optimal gain of solar heat, solar exposure for all units, both for the interiors and for the outdoor spaces, compact plans that make a central heating source usable and sustainable use of materials underscore the aim for a long lasting sustainable quality of JVA's proposition.

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- the concept of 'smart floor plan typologies' – intrinsic (project-specific)

The scheme repeats three times two wedge-shaped clusters (each with seven volumes) of interlinked dwellings, directly accessible from ground level. They consist of a ground floor pocket garden, three floors of habitable space (126 m², three to five bedrooms) plus a roof garden ('outdoor living room') on top of the interlinked second floor volume (84 m², three bedrooms) that adds to the 40 m² ground floor pocket garden. Thus, narrow North-South and wider, irregular diagonal pedestrian-only passageways from the two to four-storeyed barrier on the west side, slightly resolving to the lower canal-facing park, allow for views and accession of sunlight to all dwellings. The open – and therefore flexible – floorplans include the possibility of a second living room or playroom on bedroom level.

The barrier along the busy motorway consists of a plinth for commercial use (sometimes connected to dwelling units stacked on top) and drive-in car parks where two or three- to four-storeyed dwelling types (120 m²) and generous roof gardens as private outdoor living rooms (35 m²) are stacked, protected from traffic noise and blessed with good sunlight conditions. Stairs and a fence between service road and motorway are used as a double sound barrier, allowing for light to penetrate through two layers of glass that shut out the traffic noise. In total the whole plot of 76 dwellings consist of four dwelling types only. In short: JVA provided for a simple and rational structure that optimizes the relationship between value and cost.

- the concept of 'textile materialization' – intrinsic

Facades are developed with textile qualities made with sustainable brick and wood and reflect the general geometrical strategy for the whole proposal. Brick might be used towards the motorway as a sound barrier with an equal pattern to the wooden siding. Acoustic wooden panels, applied to the long facade that faces the motorway, prevent reflection of traffic noise into the area.

The high-density, small-scale housing project by JVA in Groningen shows how a balanced solution can be given to the challenge of an urban densification, while paying attention to the way shared in-between-space, private and public, landscape and built environment, infrastructure and accessibility can be merged into a blueprint for similar assignments that enhance great spatial and typological qualities, both on generic and site-specific levels. Nevertheless, we notice that as a draft proposal¹⁴, *Green Dice* remains a collection of dwellings rather than a real neighbourhood, since in this study project – apart from the projected commercial space in the plinth along the motorway – amenities such as a school and local supply are lacking. Therefore *Green Dice* cannot catch up yet with the walkable dense and diverse city everybody seems to talk about in the current debate, where people do not need a car to handle their daily routine, since all they need is nearby. Hence, in order to form a sustainable, actual neighbourhood, an urbanistic supporting elaboration should provide a 'catalyst'.

Yet, should we consider the concept of high-density low-rise to be something other than inner-city sprawl? Sprawl is always seen from the built object: the spread of the buildings between which the empty space, as it were, is regarded as a 'non-space', being the result of an act of building. But could it not be reversed? Can we not view sprawl from the open space, and thus, can in one way or another the entirety of 'empty spaces' make an innovative unity? An example of this at neighbourhood level is the urban ensemble Spaarndammerbuurt in Amsterdam, as described by Reijndorp¹⁵, where different forms of courtyards appear that can give rise to a walk in an urban setting.

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Dwelling Landscapes composed

By designing high-density, low-rise communities in the existing city architects can test and amend the adapted concepts, as Einar Jarmund and Håkon Vignsnes did with the concepts of 'repetition' and 'layered landscape' in their prototypical *Green Dice* proposal. They even sharpened these concepts in their ambition to create a new type of 'dwelling landscape' being an integral part of urban design. These dwelling landscapes carry the potential of reassessing the *as found* ecological and (sub)urban conditions of any given site. Thus the architects aim for a truly sustainable urban fabric, setting the stage for an urban culture.

Identity of place as a challenge for the Dutch Landscape

In *Green Dice*, a new 'framed landscape' stands out, appointing the values of 'compact city' and 'outlying land' in terms of 'city' and 'landscape'. Both can be defined as archetypes, which means that, within their typology, they are the bearers of an identity, in this case an identity of place. And this is a challenge, especially for the Dutch Landscape. Here, the flatness of the landscape is typical of the Earth's seemingly endless surface, that can be envisaged beyond the border of the horizon. Yet, this unlimited nature of the landscape has been bounded by the concept of densification. Man decided not to extend over the border of the horizon but to create a defined and limited place. In this way the process of densification challenges the identity of this typically Dutch – i.e. flat – landscape and defines 'city' as a bordered place, vitalizing the archetype of the city or 'town' as etymologically related to the German 'Zaun' or 'fence' which gives meaning to the recognition of the border as a spatial limitation. It seems as if JVA's *Green Dice* was a very suitable match of landscape-related architecture to this reading of the Dutch Landscape, even if it is much more fragmented than the surrounding landscape itself.

By exposing the most defining underlying concepts of 'repetition' and 'layered landscape', this exemplary project demonstrates that the various aspects of research by design as conducted by architects deserve to be presented as stand-alone projects, whereas in most cases, the results of an architectural process are shown by presenting mere buildings – as finished objects. Moreover, a focus on scientific support to project-defining concepts allows architecture to take position where the design – in the service of a research process – is made to a necessary partner for all supporting disciplines, that are instrumental in this process. This Research by Design approach ensures that both 'the building' and 'the urban plan' contribute to a liveable society.

Coda

In urban areas, High-density, Low-rise typologies allow for adding dwellings to the existing pattern and silhouette of the city without necessarily changing them. High-density, Low-rise provides a favourable typology for housing, being directly accessible from ground level, in an urban context, based on optimal land use. Density is not an end in itself and is not an absolute rate on which city planning should be based. A conscious understanding of high density should strive to keep our cities alive, both spatially and programmatically. Hence, a high density in a low-rise building typology should allow the landscape to become part of the residential.

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NOTES

¹ The term *Vinex* is an acronym of *Vierde Nota Ruimtelijke Ordening Extra* [Fourth Report on Spatial Planning Extra], i.e. a policy briefing note of the Dutch Ministry of Housing, Spatial Planning and Environment, released in 1988, aiming for Dutch housing production in the period 1995-2004.

² *Intense Laagbouw* [High-Density, Low-Rise, 2008-2009] was a joint research-by-design project, executed by the City of Groningen (then City Architect Niek Verdonk et al.), TU Delft Faculty of Architecture and the Built Environment (chair of Architecture and Dwelling, professor Dick van Gameren and assistant professor Paul Kuitenbrouwer: <http://www.tudelft-architecture.nl/chairs/dwelling/research/intense-laagbouw>) and 50 architects, designing 52 projects for 30 sites in Groningen, the northernmost 'compact city' in the Netherlands.

³ Exploring their free world is part of children's existential essence, i.e. the 'large world' has the obligation to disregard for a while the speculative 'importance' of the optimization of a plot and give children their freedom to play in a protected, and at the same time open world.

⁴ The campaign previous to *Intense Laagbouw* was entitled *De Intense Stad* [The Intense City, 2003-2004] and was conceived accordingly by the city of Groningen (Niek Verdonk et al.), inspired by curator Winy Maas (MVRDV) and executed by architects and clients, proposing 37 projects for Groningen, aiming for densification and mixed use of plots in the existing city.

⁵ or: 'parsing', akin to "resolve (a sentence) into its component parts and describe their syntactic roles", Oxford Dictionaries, 2015. [online] Available at: <<http://www.oxforddictionaries.com/definition/english/parse>> [Accessed 1 June 2015].

⁶ Within the framework of their high-density, low-rise campaign Niek Verdonk asked the chair of Architecture and Dwelling, Faculty of Architecture and the Built Environment, TU Delft (professor Dick van Gameren and assistant professor Paul Kuitenbrouwer) to produce an 'inspirational book' on the topic for architects and their clients: housing corporations, project developers and private investors alike. After its presentation to this group of professionals in the spring of 2008, the architects set sail and presented their design proposals in the spring of 2009. Subsequently, and accompanied by a publication, all schemes were exhibited, first in Groningen (July-August 2009) and later at the Ministry of Housing, Spatial Planning and the Environment in The Hague (January 2010).

⁷ In his article Hauberg (2011, p.50) further elaborates on research "as a broader field [that] includes experience other than that which is gained from science. Cognition is not the same as knowledge, and scientific cognition is not the only way in which we acquire new knowledge and insight. By far, most of our cognition is acquired physically by imitating or repeating, through actions and movements, by making mistakes, and feeling pain or pleasure. A fairly small part can be formulated as theory and can therefore be scientifically generalised. In essence, cognition and experience are of a personal nature, but they can also be objective and true. Conversely, theory, which is basically objective and true and often defined by time, is in the process of being replaced by a new theory. Research in Architecture is a part of all this, generally finding its requirements in the humanities tradition but not always doing this comfortably as the subject itself ranges from natural science and sociology to art and because the most important way in which the architect achieves new cognition is through work with form and space: drawings, models and completed works". Hauberg states that "the ambiguity of the drawing's theoretical potential and its role as a generalised and functional notation system maintain the special relation between reflection and creation – which is the method of architecture" (2011, p.49).

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⁸ *Green Dice* was previously published in: Dorsman et al., 2009, p.52-55; Kuitenbrouwer, P. and Saeger, R. De, 2011, pp.43-45, and Smith Wergeland, E., 2012, pp.14-17.

⁹ Jarmund, E., email to the authors, May 5, 2011.

¹⁰ Ibid.

¹¹ Jarmund Vignæs Arkitekter MNAL, 2015. [online] Available at: <<http://www.jva.no/projects/large/groeningen.aspx>> [Accessed 1 April 2015].

¹² ratio: 1.8 spaces per unit.

¹³ *Green Dice* achieves a density of 101 units/ha; gross FSI = 1,09; net FSI = 0, 62.

¹⁴ Even if economic circumstances have not allowed their design proposal to become realized, both JVA – by their research by design approach – and the city of Groningen – by the implementation of their *Intense Laagbouw* campaign – set a wonderful example in the field of high-density low-rise housing.

¹⁵ Reijndorp, A., 2015, *The return of the social; but not as we knew it*, keynote lecture, *Housing & Welfare - Boundaries|Encounters|Connections*, Copenhagen, Denmark, 7-8 May 2015.

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Since the *Norsk samtidsarkitektur 2000-2005* [Contemporary Norwegian Architecture 2000-2005] exhibition in Haarlem (NL) in the fall of 2009, Kuitenbrouwer and De Saeger have been working together in close contact with the Norwegian Embassies in Brussels and The Hague to enhance the bonds between the Low Countries and Norway.

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