

## THE IMAGE OF DENSITY – CHALLENGES OF DELIVERING COMPACT URBAN STRUCTURE IN CONTEMPORARY URBAN DESIGN IN POLAND

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### Abstract

Contemporary urban design paradigm of the “compact city” emphasizes the importance of density and mix of functions as key features in shaping urban space. While recent urban design theory on Poland seems to accept these elements, in the urban design practice achieving a dense urban structure comes across several challenges, such as the regulations (“Building Code”) and required distances between buildings, required widths of roads and walkways and numbers and distances of parking places, providing sufficient sunlight in the dwellings, etc. While a dense historic town centre with urban blocks build around a market square is a desired ideal, most new developments propose dwelling estates with freestanding multi family housing. This paper examines recent urban design in Poland and discuss attempts of achieving a high quality dense neighborhoods with the built form based on reinterpreting the traditional urban blocks. The paper overviews such cases as Miasteczko Wilanów, EcoPark or Ecological Town in Siewierz, mentions the authors design concept in Polkowice, and presents in detail own experiences with an own masterplan of a new neighborhood on a brownfield site in Goleniów, northern Poland. After winning a design competition the authors have been commissioned a masterplanning process, which included ways of public participation and stakeholder discussions, and working out variants and options of urban structure and design codes.

### Streszczenie

Obecny we współczesnej urbanistyce paradygmat “zwartego miasta” zwraca szczególną uwagę na intensywność zabudowy oraz mieszanie różnych funkcji w obrębie nowych zespołów miejskich. Pożądane wytyczne dotyczące zrównoważonych projektów urbanistycznych to zespoły gęstej zabudowy o przemieszanej funkcji mieszkaniowej i usługowej, które promują komunikację pieszą i są dobrze obsłużone komunikacją publiczną wraz z infrastrukturą i budynkami o wysokiej efektywności energetycznej (Farr, 2009). Pomimo wytycznych teoretycznych w praktyce polskiej napotykamy jednak ograniczenia związane z preferencjami deweloperów i kupujących, a także obowiązującymi przepisami prawa budowlanego. Intensywna zabudowa historyczna, bazująca na kwartałach zlokalizowanych wokół rynku jest obrazkiem często przywoływanym jako wzór godny do naśladowania jednak często zdarza się, że w rzeczywistości dożo łatwiej zaprojektować i zrealizować jest osiedle wolnostojących domów wielorodzinnych zamiast zwartej zabudowy miejskiej. W artykule przedstawiono projekty i realizacje, które można uznać za próby współczesnej interpretacji wzorca gęstej, miejskiej zabudowy kwartałowej. Autorzy omawiają kilka współczesnych zrealizowanych w Polsce projektów, oraz prezentują doświadczenia z opracowania projektu zagospodarowania terenu w Goleniowie, będącego szczegółowym opracowaniem pokonkursowym, w którym badano różne możliwości kształtowania zwartej zabudowy.

**Keywords:** Urban design; Density; Compact city; Sustainable urbanism; Urban block; Urban grid, Neighborhood; Masterplan.

## 1. INTRODUCTION

Within the emerging new paradigms of the compact city and sustainable urbanism, contemporary urban design emphasizes the importance of density and functional mix as key features in shaping new urban neighborhoods. These desired qualities are also key elements of sustainable urbanism, defined as *walkable and transit-served urbanism integrated with high performance buildings and high performance infrastructure* [1]. While recent urban design theory on Poland generally praises those elements, the architectural practice comes along several challenges in achieving a dense urban structure. The regulatory shortcomings include required distances between buildings, required widths of roads and walkways and numbers and distances of parking places, providing sufficient sunlight in the dwellings, etc. Other limitations come from the market: both investors and final clients. While a dense historic town centre with urban blocks build around a market square is a desired ideal for the urbanists, developers propose dwelling estates with freestanding multi family housing. Only recently have the general public begun to acknowledge the value of mixed use, dense neighborhoods, where communities benefit from the range of local amenities, public open spaces and local connections, and the dense, traditional urban grid and structure enhances the sense of place.

## 2. DENSITY, MIXED USE AND SUSTAINABLE URBANISM

Advocates of the compact city paradigm often refer to medieval city as an optimum solution for compactness [2]. In XIVth century most common building typology was a merchant house with ground floor designated for commercial use and upper floors for housing uses. The urban structure of a typical medieval city would be dense with very little backyards, narrow streets nearly no green areas and space for contemporary circulation. Such a density might be considered as optimal since it provides most of uses within walking distance. Due to contemporary regulations (fire protection regulations) and local requirements (local law) which depend on location such a density can not be achieved anymore.

### 2.1. Past and present requirements: density and carparking

According to contemporary planning regulations in Poland [3] both density and car parking ratio might

be set in local law by city planners. Ratios are set on the basis of planners experience and should reflect local conditions. Although the density ratios are often relatively high, the carparking ratios remain high as well and so in most cases that results in low density in total, since undercroft carparking, the only practical solution, is often too expensive. The underdevelopment of public transport and cycling infrastructure in Polish cities results in car being generally chosen mean of transportation. Motorization levels in Poland are growing, and while still lower than in Western Europe, *the important fact is that in Poland the car ownership increase happens primarily in the biggest cities. That contrasts with Western European countries where the highest motorisation level is observed mainly in rural areas, which is because providing proper public transport is very difficult and the car is the only efficient mean of transportation* [16]. This problem cannot be solved within individual solutions for individual plots, and requires overall improvements in promoting sustainable mobility and alternatives to cars. Cycling and bikeparkings and public transport is the emerging solution that allow for high density ratios with low carparking ratios [1].

If we consider that Polish Building Code limits minimum distance from windows (housing use) to car parking space (7 meters if there are 4 spaces, and 10 meters if there are 5 spaces and more) [3.§ 19], it turns out that on most plots compromise between density and carparking cannot be balanced. Polish Building Code also limits minimum distance between buildings (6 or 8 meters depending on windows in the walls) [3.§ 19] and allows for exceptions only in downtown. The demand for 6 or 8 m building-to-building spacing depends on fire regulations and does not exclude in-boundary erection of structures even outside city centres when permitted in local spatial development plans. Such a regulation determines: either large-scale investments (building spacing might be planned) or special regulation in local development plans (that regulation appears very rarely and most of the plans still are being prepared and unreveiled). All conditions mentioned above state clearly that true compactness either needs new law and new regulations or must be reinterpreted and redesigned.

### 2.2. New urbanism and the urban renaissance

While modernist urban design and planning, influenced among other by the widespread of cars called for functional zoning and freestanding buildings, the disadvantages were soon observed in both Europe

and the USA, e.g. by Jane Jacobs in the famous book *The Life and Death of Great American Cities*. The countermovement advocated the rediscovery of traditional dense built form, expressed e.g. by the American movement of new urbanism (Elizabeth Plater-Zyberk, Andreas Duany, Peter Calthorpe, and others), Rob Krier or architects associated with the Prince of Wales Foundation for the Built Environment. This search for compact neighborhoods led to several projects across Europe, such as Poundbury (Dorset, England) or Kirchsteigfeld (Potsdam, Germany). While rediscovering compact urban form, some projects have been criticized by contemporary architects for mimicking historic form of the buildings. However, several other new developments show that dense urban form can be also filled with modern architecture, e.g. Hafencity in Hamburg, Vauban in Freiburg or district22@ in Barcelona, or Richard Rogers' projects and ideas including the "Towards an urban renaissance" manifesto (1999). As Jan Gehl comments, *there is no such thing as the new urbanism. There is only the good old European urbanism which we have forgotten. I think some of the best time for the cities was in the 1920s, after the rush of industrialism, when a number of adjustments were made – more open space, more gardens. Ares of the 1920s are nicest places in many cities, like Berlage area in Amsterdam. And what we are building today is very much like in the 1920s* [4].

### 2.3. Sustainable urbanism

The paradigm of the "compact city" has gained importance along the growing awareness of ecological issues and the need for sustainable growth, which implies the importance of density and mix of uses as key features in shaping new urban neighborhoods. As Jan Gehl put it, talking of how new neighborhoods should be created and connected: We start by saying that in those neighborhoods we do everything to have people walk and cycle. Then of course you have to be much more people oriented in planning. It will have to be quite a bit denser than it used to be; so forget about villas, and all that, which can only be served by cars.

These desired qualities are also key elements of sustainable urbanism, defined as walkable and transit-served urbanism integrated with high performance buildings and high performance infrastructure [1]. While authors such as Farr give theoretical background and guidance for sustainable urban growth, sustainability criteria have recently been gathered and quantified in environmental assessment method for buildings and urban areas, such as BREEAM

(BRE Environmental Assessment Method). The BREEAM communities scheme is meant to improve, measure and independently certify the sustainability of development proposals at the planning stage [5]. The criteria are grouped in eight various categories, within which three can be related directly to compact urban form: This include energy efficiency of buildings, Transport and movement (public transport, parking, pedestrians and cyclists, proximity of local amenities, traffic management, car club), as well as appropriate use of land resources. Density and compactness of the development play a key role, both in shaping the build form and preserving green areas. Well designed compact urban form enables efficient land use and infrastructure, promotes community interaction, stimulates the edges of public spaces, and promotes and rationalizes the use of public transportation, etc.

Within the above criteria density and compactness of the development play a key role, both in shaping the build form, as well as enabling the conservation of green areas. Well designed compact urban form enables efficient land use and infrastructure, promotes community interaction, stimulates the edges of public spaces, and promotes and rationalizes the use of public transportation, etc.

### 3. REINVENTING DENSE URBAN STRUCTURE IN CONTEMPORARY MASTERPLANS IN POLAND

Poland has a long historic tradition of dense urban centers originating from the medieval times, as well as compact urban neighbourhoods built in various stages of urban development, until the first half of the 20<sup>th</sup> century (e.g. Żoliborz in Warsaw), and early after World War II (Nowa Huta in Kraków, first phases of New Tychy, etc.). The urban design paradigm and principles changed dramatically with the adaptation and simplification of modernism principles and resulted in prefabricated block of flats estates in the Polish cities in the sixties, seventies and eighties. Since the change of the political system in 1989, urban development in Poland concentrated on downtown revitalisation, infrastructure works and greenfield development of new housing estates. An overall economic development increased the demand for housing, and resulted in several private developments. Joining the EU and the possibility of acquiring funding for urban development and regeneration has had a catalysing effect, with rapidly growing real estate prices (until the stagnation in 2009). While the

political transformation in 1989 resulted in an expansion of individualism in residential developments and the dominance of suburban single family housing, and new, gated housing estates as a preferred model of living, currently the people – and thus the markets – are beginning to acknowledge the value of mixed use, dense neighborhoods, where communities benefit from the range of local amenities, public open spaces and local connections. The dense, traditional urban grid and structure is used in different variations and various locations: urban and suburban; greenfield and infill development, as well as brownfield regeneration. The following cases may give some overview of such new developments with dense urban structure.

### 3.1. EcoPark

EkoPark is a high density development on 19ha site, which has been realised since 2000 in Warsaw. The masterplan designed by Apa Kurylowicz Associates proposed 3 different quarters which would perform as a urban neighbourhood. The average housing density is 100 units per ha and has been achieved with several different typologies of buildings: starting from 4-5 floors up to 9 floors [6]. Nearly all of the carparking space has been located underground, and some space for retail use has been planned in the ground floor. Although the original masterplan allowed for participation of different architects (every single building has been designed by different architect) the housing density, carparking and green area ratios have been controlled by planners during the design process. EcoPark is an experiment for providing truly compact neighbourhood.

### 3.2. Miasteczko Wilanów

Miasteczko Wilanów is a city quarter that covers nearly 40ha and is located in the south-west part of Warsaw. Masterplan for the site, designed by Guy Perry was a proposal for mixed-use high density sustainable neighbourhood. High density housing has been achieved by using typology which allows for undercroft carparking for entire block which resembles 4-6 storey high 19<sup>th</sup> century housing blocks with large green areas inside. While high density housing has been achieved very few other functions have been built. Hard access to basic uses due to low quality service of public transport makes this neighbourhood very ambitious and promising but still unfinished. [7]

### 3.3. Ecological Town in Siewierz

This 120 ha mixed use new town is planned in Siewierz, by Przeczycko-Siewierski Lake, close to the planned A1 highway, and 12 km from Katowice Airport. The plan has been developed by TUP SA and designed by Mycielski Architecture & Urbanism. The plans implementation is currently conducted by Chmielowski S.A. The masterplan envisions a sustainable suburban urban neighborhood, with an urban block layout with multi family and single-family homes as well as shops, services and office space, supplemented by recreational open spaces, including a new market square. The project is scheduled for 25 years. In 2010 a local development plan based on the urban design scheme was enacted, and the first stage of the investment is planned to be ready by 2013, with approximately one third of the target 2,300 residential units. The initial design was conceived in a charette led by Mycielski Architecture & Urbanism in 2007, involving planners, architects and local stakeholders. The project was inspired by international new urbanism best practices such as Seaside, Florida, and the Poundbury, Dorset, UK. [8]

### 3.4. New Polkowice

The masterplan for a new, 75 ha urban extension in Polkowice was prepared in 2008 by a consortium of two design firms based in Gliwice – ARCA and AnArchi Group. Polkowice is a small town in western Poland, with a relatively high income from copper mining and a special industrial zone, and growing housing needs. The masterplan uses elements of “sustainable urbanism” understood within the paradigm of the compact city. The underlying guiding rules of the proposed spatial layout are related to the sustainable criteria such as creating a functional urban core with a new public square, staging of density, pedestrian paths, green public spaces, access to local transportation, etc. The project proposes a range of homes – from multi storey houses with retail and dining services on the ground floors, through terraced houses, semidetached houses, to town homes and villas as well as basic services for the new neighborhood (retail, dining and entertainment). It also provides a range of publicly accessible open spaces – a central square, smaller squares, green parks, sport fields, as well as links with a neighboring forest. [9]

### 3.5. Wrocław – Plac Społeczny

The 30 hectare site located next to the historic downtown and the Odra River known as Plac Społeczny

(“Social square”) is currently occupied by a major elevated road intersection. The municipality has planned traffic reorganization and the removal of roads and overpasses. The released area is to be developed as a compact urban neighborhood. The 2007 winning competition design by Gottesman Szmelcman Architecture Sarl (Paris) envisioned a dense urban block structure paired by a network of roads, public spaces – a new square and a boulevard along the river. The conceptual design of the buildings included creating landmarks, which would be visible in the end of view axes. While the competition design was not ment to be directly turned into implementation plan, it enabled to set a basic urban structure and a range of basic principles for the further development, such as establishing a lively, intense, multifunctional municipal tissue, with a mixed use of housing and services, connectivity of the street network with surrounding spatial structure, and providing a range of urban spaces [10]. A subsequent refined zoning plan (approved in 2010) was prepared by the municipal planning office, and the plan, together with and conceptual model provides a solid vision of further development. [11]

## 4. GOLENIÓW – CASE STUDY FOR NEW URBAN NEIGHBOURHOOD IN THE CITY CENTRE

### 4.1. Location, conditions and the competition design

Goleniów is a town in Northern Poland, with a population of 22 thousand people and a relatively strong economy. The town assets include the Industrial Park with a Special Economic Zone, a regional Airport located in the outskirts of the town with over 300 000 passengers annually, and a proximity of the city of Szczecin and the border with Germany. The towns rich history dates back to the 10<sup>th</sup> century, and includes times of prosperity in 14<sup>th</sup> and 15<sup>th</sup> century as a member of the Hanseatic League. Approximately 70% of the buildings in Goleniów were demolished during and after the World War II [12].

In October 2009 an open urban design competition for proposals of the new city centre called “The heart of the city” in Goleniów was won by an entry by Tomasz Bradecki, Michał Stangel, Barbara Uherek-Bradecka [13, 14]. The design proposed a livable and vibrant “heart” of the city, with unique spatial plan with different uses for diverse users, composed by several urban blocks partially enclosed distinguishing public space outside and semi-public space inside. Most of the new buildings would be of mixed use with

commercial use on the ground floor and office or housing space above.

The competition was the beginning of a process of refining the masterplan: public discussion about the results, formulating future directions of development, and refining the competition design scheme into three variants of the masterplan. The overall proposed vision was generally accepted by the town authorities and general public, but several issues required further refining. The input for further planning was gained from both the authorities comments, as well as general comments from discussions led online, in the local newspapers, and on public meetings. The discussions showed that the proposed dense urban structure was perceived as the main advantage of the plan, but the details of the development – “what buildings will the urban structure be filled with” shall remain an open question for the process of refining and detailing of the masterplan. At this stage the client refined the site boundaries for the masterplan and provided an updated land ownership structure data, as well as the transportation study of the city.

### 4.2. Envisioning a compact urban structure

The competition site is located close to the area which used to be historical, compact city centre. The original urban structure was replaced with modern structure after World War II: multifamily housing blocks of flats which are 4, 5 and 7 stories high form contemporary city centre with several commercial use – 1 or 2-stories high buildings. The remains of the city walls and several buildings from 19<sup>th</sup> century resemble the historical origin of the city. The existing housing density might be considered as relatively high: ap. 40-80 units per hectare depending on a place. However, shortage of carparking spaces has been observed. A quarter of commercial use buildings has been identified just around the north east boundary of the site. Nearly all commercial typologies have been built there: one storey high supermarket with large parking lot (located next to the Ina river), two floor small shops that form the Zielona Droga street, mix used 3 floor high buildings (commercial/housing use), and small box-shaped kiosk. Although the mixture of commercial uses seems to be positive (the place is busy, and many people have been spotted at that site in different times of day), the low quality of the building substance and lack of evening type uses (cafes, bars) makes the space rather a market than a “place”.

**Table 1.**  
Variants comparison (please refer to Fig. 1)

	Variant 1	Variant 2	Variant 3
Square	Shape: symetric, 4 frontages, full enclosure with gate, multifunctional pavillon next to Ina river	Shape: symetric, 5 frontages, partial enclosure with gap, no pavillon	Shape: asymetric, 5 frontages, water surface as an enclosing element
Carparking	ap. 174 spaces	ap. 248 spaces	ap. 222 spaces
Average housing density	37 units per ha total 180 units	32 units per ha total 160 units	ap. 27 units per ha total 130 units
Average retail density	Total 73 units + 60 units in market hall	Total 70 units + 60 units in market hall	Total 63 units + 60 units in market hall



**Figure 1.**  
Three variants with different densities



**Figure 2.**  
3D aerial view of chosen solution (variant no1 in Fig. 1)



**Figure 3.**  
Site plan of chosen solution (variant no1 in Fig. 1)



**Figure 4.**  
Aerial view of proposed market



**Figure 5.**  
Aerial view of new bridge and iconic building

In order to research different design possibilities and to engage the local authorities and community in the design process three proposals for new urban structure were created and used as a basis for discussions. All three variants addressed the issues of densifying the urban structure, creating a large open urban space within the north-western part of the site, with one of the edges being the riverbank of Ina; creating well defined active frontages to enclose the urban space, with possible use of arcades, canopies, “beer gardens” and other elements enlivening the facades and edges. The three variants differed in the proposed urban structure, as well as in the density (Fig. 1). The variants were presented and compared together with 3-dimensional models in order to find the optimal solution both for high density and high quality of the projected place. The first variant provided: the largest market square and the highest density and the least carparking, two other variants offered smaller squares and lower densities and more car parking. Different options for square use have been considered (Tab. 1)

#### 4.3. The image of density in the urban structure

All three variants in the north-east part of the site proposed market hall and mixed used buildings with a small square. However the first chosen variant has been slightly modified to leave more space for local market (Fig. 2, 3). Although all 3 variants suggested

**Table 2.**  
**Comparison of desired optimal solutions for compact city with observed solutions applied already in most cases**

Field	Desired optimal solution	Observation (live experience)
Urban structure	Urban edges in plan: enclosed positive spaces of new streets and squares between the frontages of the buildings [2]	Lack of continuous edges, gated and fenced off spaces (gated communities)
Use	Mixed use, direct access to services – shops, cafes, restaurants [15]	Single use, direct access only to basic services (shops), access to other uses by car
Urban form	Continuous build form of attaching town buildings	Continuous build form on large sites and by masterplans Discontinuous, various forms on smaller sites built by different developers, free standing multi-storey housing
Circulation	Undercroft carparking, spaces for pedestrians and bicyclers, low parking ratios, public transport [1]	On-ground carparking, spaces for pedestrians, car dependence, high parking ratios
Local streets pattern	Dense grid of public local streets (mews, residential street, high street)	Cul de sacs, private access ways
Architecture exterior	small scale, corresponding to local heritage, high quality materials	Different scale, no “heritage” insignia, low quality materials
Architecture	Large adjustable spaces, possible conversions to other uses, priority for sustainable solutions (cost and maintenance effectiveness)	Various spaces by demand, priority for reducing building cost)
Landscape	shading, canopies, awnings, elements for bringing pedestrian and bicycle movement, greenery	Low quality paving, occasional high quality landscape architecture on well recognised sites

new high quality, roof covered market hall instead of existing low quality market stalls the final plan proposed sheltered and partially open market hall along with market square (Fig. 5), where daily trade would take place in a similar form as today (Fig. 9, 10). Even though the open air daily market may not match the idea of beauty, the public consultation showed, that its presence is important for both citizens and vendors.

New bridge and a building that would become a landmark for Zielona Droga street (Fig. 5)

Large square with multipurpose glass pavilion has been proposed with mixed use 4-5 floor typology (Fig. 6). Arcades in the ground floor protect from rain and sun and attract visitors in the same way as they did hundreds years ago. The ground floor has been designed for retail use. Due to simple structural system (perimeter wall and pillars inside and isolated independent staircase) – floors above might be used for retail use (office space, retail space) or for housing needs.



**Figure 6.**  
**Perspective view of new market place**

Some of new buildings have been designed as 1-15 floor high, since proposed density needs to match the existing one even if existing urban structure appears to be rather low quality (examples from Zielona Street – Fig. 7, 8)

**4.4. The image of density in “design coding” proposals for the architectural form**

While contemporary regulations such as Building Code in Poland do not allow to create desired compactness, several solutions have already been used and might be spotted on different sites. Some of them seem to be a necessity such as: multistorey carparking instead of undercroft carparking, garage doors instead of positive facades with windows etc. The desired optimal solutions which have been proposed in mentioned masterplans has been compared with day-to-day observation of new investments in Poland (Tab. 2.)

**5. CONCLUSIONS**

The described case study of the “heart of the city” masterplan in Goleniów was the authors’ attempt to achieve a dense urban structure within a planned new development in the centre of a small town. The proposed urban structure has been limited by standard Polish technical requirements, and several other requirements which limit potential for planning

mixed use developments in architectural scale.

Conclusions on the basis of lessons from Goleniów and every-day practice suggest, that less restrictive technical requirements for new mixed use developments in the city center might help to achieve compact urban structure, and on balance be beneficial to the community. One of the most important issues in contemporary urban design is transport strategy and especially carparking provision. Undercroft carparking still remains one of the most expensive and problematic part of large investments and effects on higher real estate prices and so on smaller number of potential buyers. As effects of urban development in Poland are usually considered only in short term (fast and easy profits) instead of long term and so undercroft carparking occurs very rarely in smaller cities. In case of Goleniów 1-1 ratio for every flat has been set and that seems to be high since the site is located next to city centre and would become a centre. That results in large areas planned for carparking. Authors suggest that sites which provide access to basic uses and are serviced well with public transport, might be planned with lower car parking ratios. That would



**Figure 7.**  
Perspective view on Zielona Droga Street – proposal for shaping the active frontage on the left side



**Figure 8.**  
Zielona Droga Street today



**Figure 9.**  
Perspective view on openair market stalls and market hall



**Figure 10.**  
Market stalls today

allow for more green areas and in general would provide sustainability in new urban structures. The required distance from parking space to windows of dwellings result in relatively wide streets. Also the distances between the buildings required by the Building Code, while meant to assure privacy and sunlight access, are a restraint from a compact urban form.

Within existing regulations, the urban designers challenge is often to achieve a consensus between the distances. In such conditions, while it was impossible to achieve an overall compact urban structure in the whole site, it seemed appropriate to densify the build form enclosing the new urban spaces, and provide lower density “in the back side of the development”, to accommodate appropriate parking and semi – private green space.

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