Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information	
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Studio		
Name / Theme	Urban Fabrics	
Main mentor	Birgit Hausleitner	Urban Fabrics
Second mentor	Lei Qu	Complex City
Argumentation of choice of the studio	Combining industry with other functions including housing might be a questionable goal. Many of these industries have certain nuisances and cover large areas. Large industries are functional buildings and are not designed for people to stay in or around, it is interesting to look at it from the eye-level perspective, the human-scale and how conflicts arise. Generally, people would rather not live close to one. Therefore this research would need a strong design proposal that incorporates human scale and liveability. The Urban Fabrics studio studies the relationship between physical elements of the urban environment and other intangible elements in cities. It has a strong focus on design and uses design as a research method and to explore. At the same time the Urban Fabrics studio designs through the scales, which is important as these industries play a big role in the regional, national economy even global economy and have an impact on the regional infrastructures. As it is design oriented from the start, incorporates the concept of liveability and vital urbanism, designs through the scales, the methods and themes of the studio and the purpose of this master thesis are therefore very compatible.	

Graduation project	
Title of the graduation project	**An Industrial City** **Urban Industrial revitalisation as an opportunity for creating liveable sustainable live work environments in Zaanstad, Metropolitan region of Amsterdam. Linking spatial planning with design through rules.**
Goal	
Location:	Zaandam, Zaanstad Nederland
The posed problem,	**Problem field** A recent trend in post-industrial cities around the world is that they have been experiencing deindustrialisation (Xian & Chen, 2015). Currently the differentiation between the urban core as a front-stage zone for human residence and

	entertainment versus rural peripheral back-stage zones for automated agriculture, manufacturing, logistics and energy harvesting is becoming more distinct (Young 2018). The restructuring of urban economies away from manufacturing and toward services results in divided labour markets that generate few moderate income jobs has generated new demand for urban living (Lester, Kaza, & Kirk, 2013). Putting pressure on diversity and the social inclusiveness of cities. Furthermore, putting pressure on the rural landscape as technological change is altering the spatial manifestation of industries, through automation and digitisation processes. Even though industries have become cleaner and safer due to new technological developments, for many cities and planners, adopting compact city strategies and urban revitalisation is associated mixed-use, in other words commercial and residential redevelopment. By not including industries current development is contributing to industrial-sector suburban sprawl (Leigh & Hoelzel, 2012). Not to mention, it is just the relocation of nuisance, instead of addressing the spatial conflicts that it generates. The autonomous, standalone industrial/business park, which hosts large factories that are disconnected, spatially and managerially from the city, is a leading model in developing, contemporary industrial areas (Ben-Joseph, 2017). Because of this, it has had a dominant presence in the landscape of metropolitan regions. It raises a fundamental question about value. What aspects of the urban landscape do we deliberately want to retain or strengthen and what to change? Industry has often been perceived in an economic or political context disconnected from geographic, locational, or spatial concerns. However, increasingly this separation from geography and community is becoming unsustainable (Hatuka, Ben-Joseph, & Peterson, 2017). At the one hand, there is the movement of industries to the peripheries and its impact on the landscape, on the other hand maintaining liveable urban environments in the city. Finding out what roles industries should have in the city and also in the transition to more sustainable environments is a new challenge relevant in many metropolitan areas. The question refers not merely to the evolution of manufacturing in the twenty-first century, but also to numerous abandoned heavy industrial sites worldwide (Hatuka, 2017). At the moment, industrial land is at risk in cities. Nevertheless, a vital industrial presence in urban neighbourhoods is as important as a dynamic commercial and residential presence (Leigh & Hoelzel, 2012). Incorporating industries could help provide potential synergies with other functions in the city to create more sustainable environments. Yet, at present there is not enough knowledge on how to incorporate industries in dense urban environments in a socially acceptable, liveable and sustainable way. There is still lack of studies considering the synergies of several components and the other characteristics of the compact city apart from high density, which have not been fully examined (Mouratidis, 2018). Often, the term urban compactness refers only to the density of urban form rather than any of the other dimensions (Burton, 2000). Research addressing the competition of space and the intensification and densification of uses is therefore critical. **The testing case:** This research will focus on the municipality of Zaanstad the Netherlands, as it is the oldest industrial region of Europe and the city and villages have always known industries in close proximity of residential areas. The city also promotes and attracts tourists with its industrial history. For this reason there is great potential for this region to develop successful live work environments and integration of industries in the urban environments, as there is already a base for cultural and societal acceptance and tolerance for industries. Currently, on a larger scale, the Amsterdam Metropolitan Area (AMA) has the ambition to transform many industrial areas and business districts to mixed-use or live-work environments in Zaanstad and Amsterdam (Copping, Hagens, & Kruger,

	2017; Maak.Zaanstad, 2016; Zanen, Ponteyn, & Keijzer, 2011). While compact city strategies are promoted, in the past 30 years, the amount of industrial areas and business district has increased significantly. In 2018, the amount of industrial and harbour areas issued in the Zaanstreek and Waterland region has even peaked (Versteegh, Copping, Maat, & Dirkse, 2019). Moreover, in able to meet the demand of housing the municipality has presented an excess of industrial areas available in the Zaanstreek and Waterland area, so industries in transformation locations that do not fit in the city of Amsterdam or Zaandam anymore can relocate while still staying within the AMA (Copping et al., 2017). Therefore, the risk of industries relocating and creating industrial sprawl is present in the AMA and municipality of Zaanstad. As industries cannot compete with housing developers for land prices and are also reluctant to deal with future residents complaining about nuisances. Spatially, industries require a lot of space and infrastructure for logistics while housing needs a liveable environment. This can create conflicts in achieving compact city strategies and creating mixed live and work environments. On the other hand, the city of Zaandam is surrounded by natural reserves, and parts of Zaanstad are covered by the Schiphol airport and Noordzeekanaal harbour nuisance contours. Compact city strategies in Zaanstad are thus very relevant as they have a high demand for housing but no space left to expand. Therefore, integration of industries in cities, the competition of space and the intensification and densification of uses is very relevant in Zaanstad.
research questions and	Main RQ: How can urban industrial revitalisation in cities or an urban context be combined with other functions to design and create sustainable and liveable live work environments? SQ1: What is the future of industry (manufacturing) and its consequences and challenges in the urban fabric? SQ2: How can liveability and environmental quality be assessed? SQ3: What are current policies and guidelines regarding preserving or mixing industry with housing and other functions? Are these effective? SQ4: What is the governmental policy, spatial positioning and societal and cultural acceptance or perception of industries in Zaanstad in the Netherlands? SQ5 What types of industrial sites or industrial ecosystems are there and what is the city-industry dynamic of these types? Concerning design intervention: SQ5 To what extent can industry be integrated in the city Zaandam with regard to liveability? (What are spatial limits to integrating industries in the city? How much industrial land should be preserved or is needed in relation to its spatial manifestation as a ecosystems or network?) SQ6 To what extent can industries create synergies with other functions in the city of Zaandam, leading to a more sustainable urban environment? Concerning design strategy: SQ7 How can urban design rules be used to mediate conflicts between industry and other functions: in particular housing?
design assignment in which these result.	This research aims to reduce industrial sprawl by creating options for cities and municipalities to integrate industries within its existing urban environments in a compact and liveable way. There is an urgency for a spatial model or framework, urban design rules, that reinvents the connection between cities and industry

	especially in a densely built environment. That combines industries with other functions in a liveable and vital way, that meets the needs of the twenty-first century, includes technological innovations and addresses environmental concerns. Moreover, a change in the perception of industries towards something more positive, as part of identity and an opportunity. The project will produce three main products that are connected through research by design. First, this research aims to add to the body of knowledge of spatial integration of manufacturing, mixed-use environments and contribute with strategic urban design rules that helps generate a spatial model. It will build on the knowledge of Cities of Making and Grand Urban Rules of A. Lehnerer and others. The strategic rules are guiding instruments for spatial planning as well as urban design to combine these manufacturing industries with other functions. Second, the design will focus on how to integrate them in a compact, liveable and sustainable way. Many rules are made from a certain perspective and involve the concerns of that perspective. For integration of mixed-use and manufacturing its impact on liveability is rarely assessed. Moreover the effect and conflict between the many different rules when applied are not clear. Therefore, through research by design on the testing case location it will test the rules and evaluate its outcomes and formulation. In Zaanstad, the design will focus more specifically on two particular industrial zones or business districts which are being transformed into mixed-use areas. Third, as the future is unknown this research will also develop scenario's that deal with the unpredictable, trends, technological developments and political decisions. These scenarios also serve the purpose to reflect on the applicability of the rules and resilience against changes and unknown developments. Moreover, function as communicative images to promote a desirable future.

Process

Method description

Literature review: the key theories related to this thesis are identified and defined. Moreover, opinions, findings and information explored. This informs the problem statement, supports the formulation of the knowledge gap and defines the course of the research. Articles, books, reports are consulted.
Documents and policy review: the main spatial planning instruments at the regional, metropolitan or municipal level such as strategic frameworks, guiding principles or land use regulation, that are involved in creating mixed-use areas or live work environments. It analyses the existing limitations, restrictions and conflicts in current practice.
Mappings: mapping allows designers and planners to see possibilities in the complexity of what exists but also to realise that potential. This method is particularly important to reveal the urban system of industries its spatial characteristics and requirements and how this can adjusted to integrate more efficiently in cities and together with other functions. Geo data resources are used and other information sources to draw maps.
Case Study: a spatial quantitative and qualitative analysis will be done to compare the spatial characteristics of five exemplary cases that have integrated various types of (manufacturing) industries. Such as densities or footprints sizes and degree of variation, public -private transitions, dispersion of functions etc. Sections, maps and other imageries will support this analysis. The acquired knowledge of the results from the analysis will be used to help evaluate rules and serve as reference projects for the spatial model to be designed. As these cases are from very different contexts, it hopes to support a more universal formulation of the rules.

Fieldwork: information is gathered from the test location, Zaanstad in the Netherlands. Pictures, sketches and maps are used to record the experience, characteristics and the main urban issues of the place. Interviews with local residents and businesses may reveal existing qualities and conflicts. Moreover interviews draw up the necessities and requirements of work environments.
Guiding principles, rules: The grand urban rules of Lehnerer (Lehnerer, 2009) are integrated, operational tools in planning and design. The potential of rules exists in the degree of tolerance or interpretation> Rules are consciously applied freedoms, rather than sharp fixations like regulations. The rules are subjective to research as well as used as a design tool.
Research through/ by design: to explore opportunities and to generate solutions by taking advantage of the freedom of design thinking. In particular, to explore the potentials in the test location in Zaanstad, to increase understanding of the mechanisms involved in live work environments. Moreover, possible future directions and its spatial implications are explored through scenario testing. These design interventions and patterns will be set against implementation on a test-site in Shenzhen. As contexts are completely different, the degree of possible integration of this found design intervention, will reflect upon its suitability and the universality of the rules or patterns.
Scenarios: As thinking tools, scenarios can be very useful for analysis, testing, option generation and opinion forming. Scenarios are an inherent part of research by design, generating hypothetical solutions for comparative analysis in order to gain insights into possibilities and scale of the task. Such research helps to recognise limits and crucial decision points (Salewski, 2010).

Literature and general practical preference

Compact city:

Burton, E. (2000). The compact city: Just or just compact? A preliminary analysis. *Urban Studies*, *37*(11), 1969–2001.

Mouratidis, K. (2018). Is compact city livable? The impact of compact versus sprawled neighbourhoods on neighbourhood satisfaction. *Urban Studies*, *55*(11), 2408–2430.

Mouratidis, K. (2019). Compact city, urban sprawl, and subjective well-being. *Cities*, *92*, 261–272.

Waals, J. F. M. van der (2000). The compact city and the environment: A review. *Tijdschrift Voor Economische En Sociale Geografie*, *91*(2)

Li, Y. (2007). Thinking of Compact City. *China Academic Journal Electronic Publishing House*, *01*, 87–90.

Mixed-use:

Coupland, A. (1997) .Reclaiming the city mixed use development. Great Britain, Osney Mead, Oxford: Alden Press.

Foord, J. O. (2010). Mixed-Use Trade-Offs: How to live and work in a Compact city Neighbourhood. *Built Environment*, *36*(1), 47–62.

Grant, J. (2002). Mixed Use in Theory and Practice. *Journal of the American Planning Association*, *68*(1), 71–84.

Hirt, S. (2012). Mixed Use by Default : How the Europeans (Don't) Zone. *Journal of Planning Literature*, *27*(4), 375–393.

Hirt, S. A. (2016). Land Use Policy Rooting out mixed use : Revisiting the original rationales. *Land Use Policy*, *50*, 134–147.

Hoppenbrouwer, E., & Louw, E. (2005). Mixed-use development: Theory and practice in Amsterdam's Eastern Docklands. *European Planning Studies*, *13*(7), 967–983.

Rowley, A. (1996). Mixed-use Development : Ambiguous concept , simplistic analysis and wishful thinking ? *Planning Practice and Research*, *11*(1), 85–97.

Vitality:

Adams, D., & Tiesdell, S. (2007). The vital city. *Town Planning Review*, *78*(6), 671–680

Jacobs, J. (1961). The Death and Life of Great American Cities. London: Pimlico.

Montgomery, J. (1998). Making a city: urbanity, vitality and urban design. *Journal of Urban Design*, *3*(1), 93–116.

Talen, E. (2006). Design that enables diversity: The complications of a planning ideal. *Journal of Planning Literature*, *20*(3), 233–249.

Tunström, M. (2007). The vital city: Constructions and meanings in the contemporary Swedish

planning discourse. *Town Planning Review*, *78*(6), 681–698.
Zhou, J. (2012). *Urban Vitality in Dutch and Chinese New Towns A comparative study between Almere and Tongzhou*.

Liveability:

Badland, H., Whitzman, C., Lowe, M., Davern, M., Aye, L., Butterworth, I., … Giles-corti, B. (2014). Social Science & Medicine Urban liveability : Emerging lessons from Australia for exploring the potential for indicators to measure the social determinants of health. *Social Science & Medicine*, *111*, 64–73.
Lowe, M., Whitzman, C., Badland, H., Davern, M., Aye, L., Hes, D., … Giles-Corti, B. (2015). Planning Healthy, Liveable and Sustainable Cities: How Can Indicators Inform Policy? *Urban Policy and Research*, *33*(2), 131–144.
Dorst, M. van. (2005). *Een duurzaam leefbare woonomgeving* (TU Delft). Retrieved from http://www.eburon.nl/een_duurzaam_leefbare_woonomgeving

Urban industrial revitalisation:

Ben-Joseph, E. H. T. (2017). Industrial Urbanism: Typologies, Concepts and Prospects. *Built Environment*, *43*(1), 10–24.
Hatuka, T. (2017). Industrial Urbanism: Exploring the City–Production Dynamic. *Built Environment*, *43*(1), 5–9.
Hatuka, T., Ben-Joseph, E., & Peterson, S. M. (2017). Facing forward: Trends and Challenges in the development of industry in cities. *Built Environment*, *43*(1), 145–155. https://doi.org/10.2148/benv.63.3.145
Lester, T. W., Kaza, N., & Kirk, S. (2013). Making room for manufacturing: Understanding industrial land conversion in cities. *Journal of the American Planning Association*, *79*(4), 295–313. https://doi.org/10.1080/01944363.2014.915369

Rules:

Lehnerer, A. (2009). *Grand Urban Rules*. Rotterdam: 010 Publishers.

General practical preference:

These documents and reports promote live-work environments or the integration of manufacturing in urban environments. Most of them concern principles or rules for strategic design or frameworks.

Borra, B., de Jong, V., Hartmann, P., Nycolaas, R., Schut, M., & Urhahn, G. (2018). *Mensenwerk Hoe geven we ruimte aan de toekomst van werk?* (F. Liebrand, Ed.). Amsterdam: Spontaneous City.
Declerck, J., Dudal, R., Claeys, S., Assche, S. van, Vandenbroele, J., Grietens, E., & Verdonckt, F. (2014). *Productive BXL*. Brussels.
Dellot, B., Warden, J., Hill, A. V., Croxford, B., Aparisi, T., Wallace-Stephens, F., … Gobatto, F. (2018). *Cities of Making - Cities Report*. Retrieved from http://citiesofmaking.com/wp-content/uploads/2018/05/CoM_CityReport-0523-HR.pdf
Croxford, B., Domenech, T., Hausleitner, B., Vickery Hill, A., Meyer, H., Orban, A., … Warden, J. (2019). *Cities of Making Foundries of the Future*. Brussels, London, Rotterdam & The Hague.
Gemeente Amsterdam. (2017). *Ruimte voor de Economie van Morgen*. Retrieved from https://www.amsterdam.nl/bestuur-organisatie/volg-beleid/economie-van-morgen/
MUST stedebouw. (2019). *Werken aan een Nieuw Amsterdam*. Amsterdam
WE MADE THAT LLP. (2018). *Industrial intensification and co-location study: design and delivery testing*. London.
Zandbelt, D., Alkemade, F., & Strootman, B. (2019). *Guiding principles Metro Mix*. Den Haag.

Reflection

1. What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?

This master thesis encompasses the field of Urbanism and the Urban Fabrics studio track. The current planning strategies and city making guiding principles or rules have been unsuccessful to achieve integration of industries in mixed-use environments or live work districts. Urban industrial integration requires good urban design and strategy and addresses many themes of the field urbanism such as liveability, vitality and compact city.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework.

Societal relevance:

Currently industries with a certain nuisance are subjected to the peripheries, having a big impact on the environmental quality of the landscape, its cultural heritage, migration of workers, but also on the liveability of the neighbouring villages. Actually only moving the nuisance to another location where it is less populated, at the same time giving even more space to these industries. It does not address the conflict it creates and is increasingly becoming unsustainable in light of climate change and nature and biodiversity loss. It raises the questions of how socially inclusive and sustainable current planning policies are that support this development. Why is it important that spatial planners and urban designers consider integrating urban manufacturing? When factories moved outside the city into windowless boxes, the anonymity was mutual. Manufacturers were as satisfied to exclude the public as the public was to dismiss industries to the separated zones or the rural periphery. This attitude must change, as the industry needs to reclaim its role as a good, productive urban member in cities. Technology can enable the reintroduction of industries. Accordingly, it can mitigate the harmful effects of industrial sprawl and revitalise urban neighbourhoods. Transparency is an important aspect, it has proven to be successful in improving the marketability of cities and factories. Moreover, manufacturers who take pride in their work inspire and share this pride with the public, connecting means of production and the city's creative and constructive spirit and strengthen economic clusters with the benefits of knowledge spill-overs while the city provides a robust labour market.
Integrating industries in cities can therefore address the spatial mismatch between class and income, the integration a variety of people into the job market, the accessibility to services, facilities and work. Proximity and transparency in factories increases trust and creates stronger connections to the products and services that are delivered. With the increasing environmental pressures of climate change, this is becoming of more importance, with no sector left out of scrutiny. These issues address the social inclusion of a diversity workers in cities, liveability issues and conflicts generated by essential players in the production and facilitation of our lifestyles. In addition the responsibility of cities and the people in it in addressing environmental challenges.

Scientific relevance:

A general assumption is that the compact city is the most sustainable urban form as well as public policy. The compact city paradigm is widely considered a necessity for addressing relevant environmental issues and has been recognised as a future development strategy by numerous leading institutions. However, is not without its critics. There is still lack of studies considering the synergies of several components and there are other characteristics of the compact city apart from high density, which have not been fully examined (Mouratidis, 2018). Often, the term urban compactness refers only to the density of urban form rather than any of the other dimensions (Burton, 2000). To broaden current perspectives, this thesis aims to add to the body of knowledge on the intensification and densification of uses, addressing the competition of space. Researching the limits of how to combine industries with housing in cities contributes to the research on compact city strategies, such as urban (industrial) revitalisation and mixed-use development. Liveability is an important concept in this research. This research may further explore the boundaries of acceptance and cultural and societal perspectives on living in compact cities and mixed-use environments. In particular, the integration of industries in different contexts, testing different possible scenarios, densities and mixed-use environments. Moreover this research aims to contribute to the urban metabolism paradigm, researching the possible synergies between the components of the compact city and industries. Such as high density, the economic and spatial ecosystem of industries with the concept of material flows. It

can contribute to form a multi-dimensional resource management model that can create synergies in the industry-city dynamic.

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Young, Liam. 2018. "Machine Landscapes Architectures of the Post-Anthropocene". Architectural Design 89.

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