The Eudemonic City:
Architectural Principles for Urban Well-Being

by

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Contents

Abstract

Emerging cross-disciplinary research between psychology, neuroscience and architecture is informing perspectives on urbanism and the built environment. Better understandings of ‘happiness’ and its measurement have given us the ability to determine that urban dwellers are less happy than their rural counterparts, a phenomenon dubbed the Urban-Rural Happiness Gradient. Given the global trend towards urbanism, this thesis asks what aspects of the urban built environment could be contributing to this phenomenon. A survey of findings across multiple fields are amalgamated and organized into a cognitive framework that defines a set of architectural principles for the design of urban public space. A multi-use, acupuncturist-style design proposal along Gottingen St in Halifax, NS tests the implications of these principles at multiple physical and social scales.

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It takes a village to pull teeth.

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Chapter 1: Introduction

> It is audacious to believe that the city might build happiness just by changing its shape.
>
> But it is foolish not to chase the thought, because around the world, and especially amid the sprawlscapes of modern North America, the evidence shows that cities do indeed design our lives.[1]

Most of us are urbanites. In 2014, the UN reported that more than half of the global population resides in urban areas, and that figure is projected to increase to almost 70% by year 2050.[2] The benefits of living in the city are numerous and plentiful, but happiness doesn't seem to be one of them. Despite the fact that "infrastructure, socioeconomic conditions, nutrition and health care services are clearly better in cities than in rural areas,"[3] living in cities is known to be a great cause of mental stress, leading to higher risk of mental disorders and ultimately impacting peoples' life satisfaction. This phenomenon is nicknamed the Urban-Rural Happiness Gradient,[4] and it holds true for Canadian cities as with others. Given this, and given that it affects most of the global population, we should be asking – and we are – what is it about cities that are making people less happy than their rural counterparts? More importantly, what can be done about it?

The built environment of cities undoubtedly plays a role, and we've perhaps always instinctively understood this about cities. The careful consideration of utopic, productive and happy cities has been an area of concern for almost as long as we've been living in them. Le Corbusier's Ville Radieuse and Ebenezer Howard's Garden Cities are two prime examples, but perhaps the first to concern themselves with the environment of our cities and the happiness of its people is Aristotle. His writings include theories on healthy societies, cities, and, most famously, happiness. The term Eudaimonia is used by Aristotle to describe what many have oversimplified as happiness, but what might more accurately describe a deeper satisfaction with oneself and life, and the realization of one's

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1 Charles Montgomery, *Happy City: Transforming Our Lives through Urban Design* (Canada: Anchor Canada, 2014) 43.

2 United Nations, *Department of Economic and Social Affairs*, Population Division (2014).

3 Mazda Adli, "Urban Stress and Mental Health", LSECities, November, 2011, https://lsecities.net/media/objects/articles/urban-stress-and-mental-health/en-gb/.

4 Brian J.L. Berry and Adam Okulicz-Kozaryn, "An Urban-Rural Happiness Gradient," Urban Geography 32, no. 6 (2013), DOI:10.2747/0272-3638.32.6.871.

true potential. At least, such is the opinion of many academics, including Carol Ryff, who has borrowed and built upon Aristotle's Eudaimonia through the lens of psychological research to define a framework for psychological well-being.[5]

This breakthrough in happiness science has led us to understand well-being not simply as an absence of mental illness or negative affect, but as a eudemonic concept. This revival of Aristotelean thought extends to environmental psychology and a growing interest in the collaboration of psychologists, neuroscientists, and designers. Because we better understand what contributes to our happiness and how to measure it, more and more professionals are taking interest in multidisciplinary implications. Happiness economists, for example, merge happiness science with their mother field to better predict economic phenomena. Psychologists and neuroscientists are considering how the built environment affects us, given that that is where we spend most of our time. Here enters the architect and architectural research: clearly there is a history and a basis for the designed environment to impact the minds of its occupants, but can this research follow a trail of interdisciplinary clues to arrive at spaces in the city which contribute to psychological well-being? The answer is undoubtedly a complicated yes: cities are a hugely intricate system, as is happiness in the human mind, and the thing that relates the two is perception. If we merge insights from psychology, neuroscience, planning and urban theory, phenomenology, environmental behaviour science, and architectural theory, can we approach an architecture that speaks to our cognition and supports our psychological well-being, for the good of both individuals and society as a whole? Put more simply:

How can architectural principles derived from multidisciplinary understandings of happiness be implemented to improve the eudaimonic well-being of urban dwellers through the design of public space?

The main research methodology involves a synthesis of multidisciplinary theory, resulting in architectural principles geared towards the perception of spaces and how that might impact precise aspects of well-being and Eudemonia. The principles become a tool for both analysis and design, in a way improving themselves through each investigation.

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5 Carol Ryff, "Happiness Is Everything, or Is It?" J*ournal of Personality and Social Psychology* 57, no. 6 (1989),1069-1081.

The principles are tested through an architectural intervention along an urban street in Halifax, Nova Scotia, chosen for its potential for site analysis and intervention. The result is an architecture that reduces social isolation, empowers environmental mastery, and facilitates daily activity which will have a positive impact on residents' Eudemonic well-being.

Chapter 2: Necessary Background and Theoretical Approach

From Happiness to Well-Being

Historically, we have thought of happiness as a philosophical state. Everyone knew what it felt like, but defining it has long been a challenge. The ancient philosophers concerned themselves with the topic, as have countless since them, architects included. Aristotle's *Nicomachean Ethics* describes happiness as eudaimonia, and it plays a key role in the philosopher's vision of an ideal city. Moving through history, at its inception the field of psychology inherited many approaches from the philosophers. Psychologists, attempting to be able to quantify and accurately measure happiness and its effects, have struggled to ground measurements in 'scientific' background theory, and, as noted in Carol Ryff's revolutionary 'Happiness Is Everything, Or Is It? Explorations on the Meaning of Psychological Well-Being' (1989), the field has largely been more concerned with the unhappiness of people rather than the study of their happiness.

Even as the field developed more stringent measurements for happiness, psychologists struggled with the subjectivity of it all. Ryff's main criticism of previous approaches is that it borrowed from the Aristotlean lexicon without truly reflecting the nuances of the terms. In particular, the phrase 'eudaimonia' is often translated simply as 'happiness' - but she points out that eudaimonia is described as counterpoint to 'hedonia'. These two words help us come full circle in understanding approaches to the study of happiness.

Eudaimonia describes a kind of happiness that might more accurately be described as deep contentment with oneself and one's life: "the feelings accompanying behavior in the direction of, and consistent with, one's true potential".[6] Hedonia, on the other hand, is the root word for hedonism, which often gets caricaturized but ultimately describes the happiness associated with external stimulants. The main distinction between the two are that eudaimonia is intrinsic, while hedonia is extrinsic. That's not to say that hedonic

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6 Ryff, "Happiness Is Everything, or Is It?" 1070.

happiness doesn't have a role to play in our eudaimonic happiness, but rather that its impact on our mental health and even physical health is negligent compared to the impacts of eudaimonia, or, more officially, psychological well-being (PWB), Ryff's theory on happiness. Happiness has ceased to be a philosophical state and is now a physiological one.

It is in this context that Ryff often refers to psychological well-being as Eudaimonia, as will I, and this context in which she developed the six factors of PWB not only as tools of measurement but tools for practice.

Factors of Psychological Well-Being

Ryff's Six Factors

Here I will define the six factors of psychological well-being and postulate ways in which architectural considerations might impact each factor. Each definition is adapted from Ryff's 1989 article, "Happiness Is Everything, Or Is It?".

Self-acceptance

> Holding positive attitudes towards oneself. A central feature of mental health as well as a characteristic of self actualization.

Architecturally, one can envision barrier-free design, inclusive spaces and political contexts of design and occupancy use having an impact on self-acceptance. Politics of economy, identity, race, gender, income and class as they relate to architecture are all factors here. Easy, navigable and unsegregated barrier-free circulation could conceivably have a positive impact on the self-acceptance of a person with physical disabilities. "Pigeon spikes" implemented at seating-level window ledges in cities could conceivably have a negative impact on the self-acceptance of a person living on the streets. Less extremely, how we feel in spaces and relate to them, how they force (or don't) us to move and use them, and how safe they feel might all impact our views about ourselves.

Positive relations with others

> Warm, trusting interpersonal relations. Strong feelings of empathy and affection for all human beings.

Architecturally, this is the bread and butter of a lot of schools of thought. Design for social interaction, the gathering of people, and how they move about each other is a fundamental aspect of architecture. “Good” architecture is both beautiful and lively. “Bad” architecture is desolate, unkept and abandoned or destroyed (think Pruitt-Igoe). This thesis comes from the perspective that architecture - particularly but not exclusively public architecture - is fundamentally about the management of people.

Further to this obvious broad alignment, some key words also offer clues as to the architectural impact on eudaimonia. “Warm, *trusting* personal relations*,”* for example: here trust and safety are implied. How do spaces make us feel safe, or unsafe? In what spaces do we not fear strangers? These are not unanswered questions.

Autonomy

> Self-determination, independence, and the regulation of behaior from within. An internal locus of evaluation. Individuation. A sense of freedom from the norms governing everyday life.

As will be a theme throughout this thesis, many of these definitions and concepts end up interconnecting. One can easily see how accessible and barrier-free design can impact a person’s autonomy.

Autonomy differs slightly from the other dimensions of eudaimonia in that the most significant architectural impact might boil down to the attitude of the designer. Prescriptive approaches to design or “people management” removes the autonomy of those people. It is therefore the strong position of this thesis that the resulting design principles are in no way to be viewed as prescriptive design tools, but rather guidelines for where time and attention can be best spent to design eudaimonic spaces.

Environmental Mastery

> The individual’s ability to choose or create environments suitable to his or her psychic conditions. Ability to manipulate and control complex environments. Active participation in and mastery of the environment.

This, along with social relations, is the most obviously architectural dimension of eudaimonia. It is also the hardest to define. The term “environmental” has both a specific psychological and architectural meaning, and their intersection is what most interests me.

Here, the environment represents a system or a situation. It can mean a social event, a career choice, or your apartment. Environmental mastery can look like organizing a book club, or doing your dishes.

> In architecture, environment is place. It is climate and weather. It is the 'feel' of a space. It is the morphological condition of a place.

These intersect in a place (literally) that promotes choice of action (autonomy), choice of social interaction, and choice of physical movement. A place where a person can manipulate themselves to be exactly as engaged and comfortable as they want to be. In many ways, when we discuss these psychological terms in spatial context, environmental mastery is the sum of the concepts discussed through 'self-acceptance' and 'autonomy', though the whole is greater than the sum of its parts.

Purpose in Life

> Beliefs that give one the feeling there is a purpose in and meaning to life. Goals, intentions, and a sense of direction. A feeling that life is meaningful.

Purpose in life has fewer architectural implications than other dimensions of eudaimonia. However, programmatic choices can, I believe, have an impact. Without places designed for meaningful activities, it is much harder for these activities to occur. Perhaps architecture's role here is to provide opportunity rather than directly impact.

Personal Growth

> A person continues to develop their potential, to grow and expand as a person. Openness to experience, continual development and growth, confronting new challenges.

Much like for 'purpose in life', architecture's role in a person's personal growth may simply be to provide opportunity. Little design surprises, discoveries to be made, and instilling a sense of exploration or curiosity might be design choices that help flex the personal growth muscle.

Now that we are familiar with the dimensions of eudaimonia, and have begun to scratch the surface of the architectural implications, it should be made clear why this definitive framework is so important.

Impact and Efficacy

Defining ‘happiness’ so stringently is not a pedantic exercise. When we consider a quantifiable problem such as the urban-rural happiness gradient, do we not want to ensure that when we spend time and energy on a solution, it will have a meaningful and effective impact?

Ryff published a survey of studies that in some way utilized her framework for psychological well-being in 2013, nearly 15 years after her seminal paper. A veritable sea of research (see fig. 2 for a visualization) had been conducted by other psychologists that studied not only the practical implications of the framework, but also methodologies in measurement, how well-being impacts several asepcts of life including family relations, aging, social interaction, and even community and societal relations, and finally how psychological well-being impacted physical health. The findings are sometimes empirical confirmations of instinctive assumptions, and sometimes surprising.

There are two takeaways that I’d like to draw attention to:

1. Psychological well-being is correlated with community well-being.
2. Psychological well-being is correlated with physical health.

In other words, the reason we should all care significantly more than we do about our own PWB and even our collective PWB - especially in cities - is because it affects so much more than simply what’s in our heads as individuals. Communities where individuals report higher PWB simply *are stronger communities*. Healthcare costs and crime rates decrease. People live longer and trust each other. The Eudaimonic City aims at Utopia without needing to get there for us to see positive impact.

Multidisciplinary Approach

This definition of happiness from the field of psychology was chosen partly for its proven efficacy in both measurement and application, partly for its depth and clarity, and partly for its correlation with other aspects of individual and societal health. Understanding eudaimonia is central to developing a framework for this thesis, but it is not in itself the

mine of information and theory that informs the principles laid out in Chapter 5.

In considering the question of how architecture impacts the mind, two seperate but interestingly similar groups of allies presented themselves: the phenomenologists and the neurologists. Both are concerned with perception, though their approaches are almost comically different, but reconciling the two is easy when one thinks of certain branches of neuroscience as empiricized phenomenology. Ultimately, they are both concerned with how a person's environment affects them. Architectural theorists Juhani Pallasmaa and Sarah Robinson co-edit Mind in Architecture: Neuroscience, Embodiment and the Future of Design (2015) from the perspective of architects concerned with the phenomenology of spaces and urge forward a budding cooperation between architects and neuroscientists. In the introduction, Sarah Robinson writes:

> Diverse disciplines such as biology, psychology, cognitive neurosceince, and phenomenology steadily yielded evidence of the extent to which mental properties depend on the functioning of the human nervous system. They collectively converged on this fact: all human endeavours depend upon our brains functioning as organic members of our bodies, which are in turn actively engaged with the ecologica, architectural, social, and cultural environments in which we dwell.[7]

In other words, yes, this exploration does matter. Mind, body, and place are connected. We've known this, and now we are understanding it. In fact, we are coming to understand that those 3 concepts are not seperate, as such, and broadening our toolkit across disciplines while accepting all as equally valued enables us to conceive of and describe the subtlety, nuance and complexity in the rhizomatic affects of architecture on people. This thesis, therefore, does not favour one discipline over another, but celebrates their intersections and amplifies their similar paradigms.

That being said, this thesis is an architectural one. In phenomenology, urban planning theory, biology, psychology, environmental behaviour science, and neuroscience, similar nuggets of information present themselves and different fields corroborate each other. A main methodology in preparation for design involves the gathering, disseminating, categorizing, grouping, and editing a huge body of sometimes uncorrelated research and theory into a set of principles.

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7 Sarah Robinson and Juhani Pallassmaa, eds., *Mind in Architecture: Neuroscience, Embodiment, and the Future of Design* (Cambridge, MA: The MIT Press, 2015), 3.

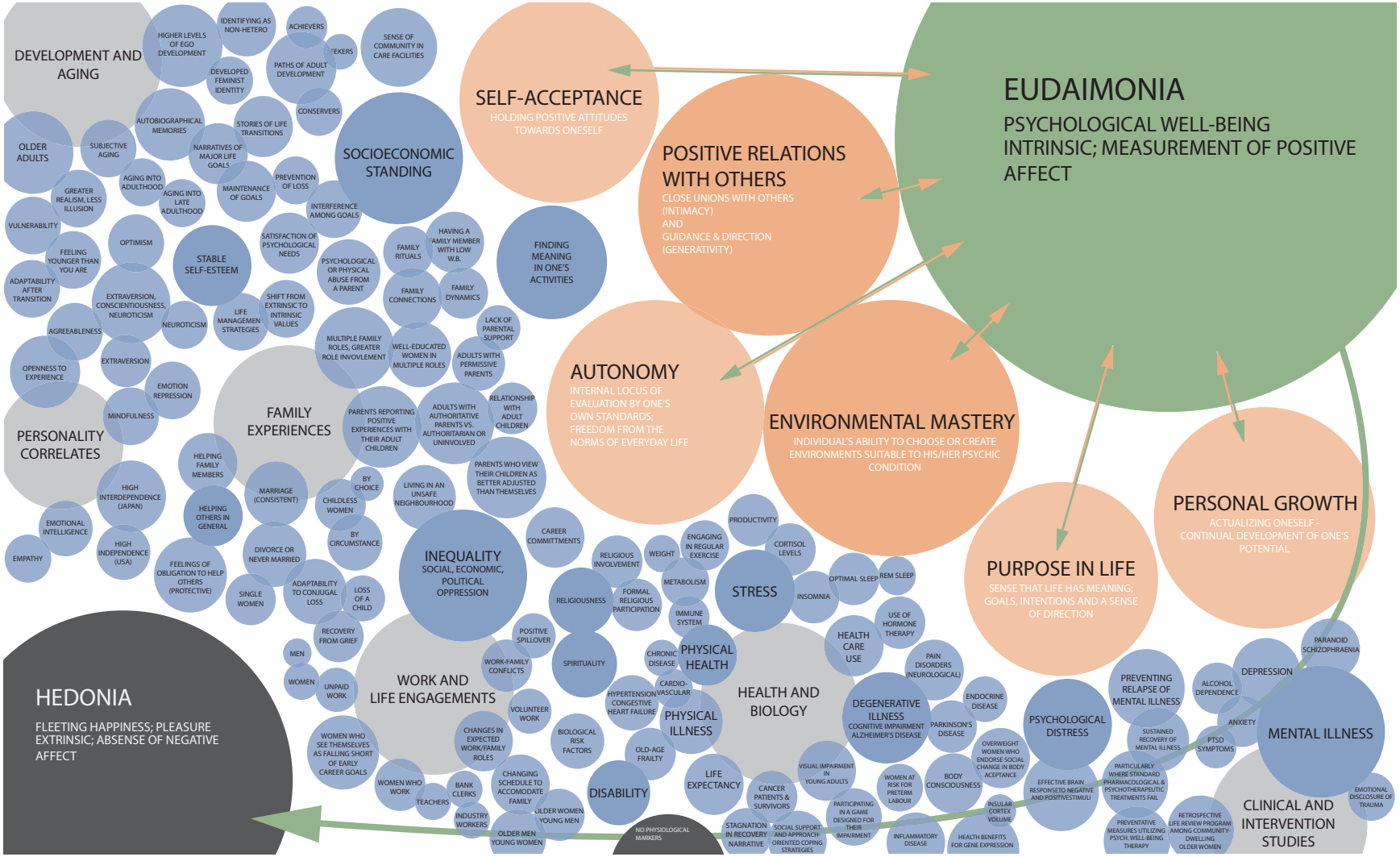

Fig. 1 Studies on Eudaimonic dimensions and their impact; along with themes in the research. Visual summary of Ryff, Carol. "Psychological Well-Being Revisited: Advances in the Science and Practice of Eudaimonia."

Why Bother? Also: Modernist Functionalism

A point of objection to be addressed: do the results of this research ultimately tell us anything we didn't already know, at least instinctively, about 'good design'? Robert Sommer in Personal Space (1969) writes: "When it comes to materials and structures, architects join engineers in carrying out systematic research, but in the behavioral realm, the way buildings affect people, architects fall back on intuition, anecdote, and casual observation."[8] Why do architects merely 'fall back' on traditionally accepted 'good design' for its behavioural impact? Why are post-occupancy reports rarely undertaken? It is true that some of what is instinctively good design is now corroborated by the sciences: a cognitive scientist (Gabriel Radvansky) began with the phenomenological observations of Gaston Bachelard and studied the cognitive effects of passing through doorways, for example.[9] The value of this research was that it did not simply corroborate empirically that the brain registered passing through a threshold, but that it went on to teach us more about ourselves and help us to understand better how these effects can be wielded as tools, with intentionality. Passing through the threshold caused the brain to have more difficulty remembering objects in the previous room, for example. "Radvansky's studies [...] have paved the way for a more detailed scrutiny of the interactions that take place between experience, memory, and the rooms in our homes," writes Collin Ellard.[10] While the example shows the science corroborating the 'common sense' (to architects), this isn't always what happens: "intuitive thinking is powerful but what is intuitively obvious and just common sense is often simply incorrect."[11] An entertaining and poignant example to illustrate: people show a strong preference for curves over rectilinear forms. Curved forms "elicit feelings of happiness and elation, while jagged and sharp forms, tend to connect to feelings of pain and sadness".[12] In a study conducted by psychologist Oshin Vartanian, it was found that people judged architectural spaces as safer and more beautiful when

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8 Robert Sommer, *Personal Space: The Behavioral Basis of Design* (New Jersey: Prentice-Hall Inc., 1969), 6.

9 Colin Ellard, *Places of the Heart: The Psychogeography of Everyday Life* (New York: Bellevue Literary Press, 2015), 67.

10 Ellard, *Places of the Heart*, 67.

11 Jon T. Lang and Walter Moleski, *Functionalism Revisited: Architectural Theory and Practice and the Behavioral Sciences* (United Kingdom: Ashgate Publishing, Ltd., 2010), 315 / loc 5684.

12 Ann Sussman and Justin B. Hollander, *Cognitive Architecture* (New York: Routledge, 2015), 123.

they were curvilinear over spaces that were rectilinear[13]. Meanwhile, architects show the opposite preference. This dissonance manifests in a discrepancy between a genuine intent (at beauty and feelings of safety) on the part of the architect and the reality of the design. This discrepancy is the hallmark of failed design.

Another consideration: it cannot be taken for granted that 'good design' is inherently humanist. Individual and public well-being are not subject to *a priori* guesstimation, nor is good design, and especially not eudaimonic design. A simple survey of past architectural movements show plainly that even humanist approaches to design have fallen short or even become harmful. Without careful consideration and informed intent, the trend towards cognitive and evidence-based architecture faces the same dangers that befell modernist functionalism: the aforementioned dissonance between intent and result,[14] and an overconfidence in the architect's assumptions about what is best for everyone else. Charles Montgomery phrases it well: "The messianic certainty of the high modernists of the last century makes it easy to pick on them"[15], but we do so with a healthy respect for what was a necessary revolution in the attitude of designers towards architecture. Modernist functionalism has paved the way for current attitudes in design and can be considered the seed of evidence-based design. While evidence-based design can arguably be called the contemporary functionalism, its attitude is (perhaps self-evidently) that we make design choices based on what we know, and not on what we assume we know. Consider this:

> Frequently there is a social, economic, cultural, and an administrative gap between users and architects. As a result, architects need to be able to ask important questions about the tasks they face instead of designing by habit using the same patterns in their repertoire time and again.[16]

Though this reads like CIAM rhetoric, the authors go on to clarify: "The structure and content of functional theory are not static. [...] Understanding what works and what does not is important so functional theory cannot be frozen in time."[17] A eudemonic architecture - inherently a functionalist endeavor - is not intended to provide a static list of musts. The

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13 Sussman and Hollander, *Cognitive Architecture*, 126.

14 Lang and Moleski, *Functionalism Revisited: Architectural Theory and Practice and the Behavioral Sciences*, 315 / loc 5684.

15 Montgomery, *Happy City,* 93.

16 Montgomery, *Happy City,* 315.

17 Montgomery, *Happy City,* 316.

principles to be outlined will be both specific and broad: specific in the way the architecture communicates with the brain, but broad in what it says. The research in all related fields is continuing to enrich and demystify at a rapid rate, and so a eudemonic architecture is dynamic and self-evaluating.

Chapter 3: Urban Scale

Agoras and Utopias

Architects' concern with happiness in cities is not newly developed, though they may have framed or worded their concern in different ways. Aristotle maintained that the true purpose of both the individual and polis was eudaimonia. The city, village, household, and person were no different in this sense except in scale. When the individuals were happy, so was the city. (Turns out, according to contemporary happiness science, he was right.) His focus on how to achieve this was largely sociopolitical, but nonetheless had spatial implications. The agora, as an archetype, is a defining characteristic of cities everywhere. Public space is integral to conglomerate living. Even in periods of history that, out of necessity or zeitgeist, were not concerned with happiness as such, the built environment reflected the closest thing to it: safety and religion (an outlet for social relationships). Feudal communities were built to reflect this, with the walled-city style organization and the building of worship centered for gathering and socializing (and worshiping).

In the last couple of centuries, there have been several more overt proposals and attempts at designed happiness. Ebenezer Howard's Garden Cities, for example, attempted to maximize economic and social production to ensure the happiest communities. Le Corbusier also concerned himself with the design of communities, from home scale to Paris scale, with varying degrees of implementation and success. La Ville Radieuse, for one, may or may not have worked, but not having been built we will never know. On a smaller scale, les Unités d'Habitations incorporate some similar ideas, and interestingly vary in success by iteration and city (further discussed in Chapter 4). Oscar Niemeyer and Lucio Costa's Brasilia marks another modernist proposal for urban design, this time built. Incorporating many modernist urban ideals, such as the separation of pedestrians and cars, rectilinear and zoned planning, and homogenaeity, "On paper, it was a triumph of straightforward and egalitarian central planning."[18] Once occupants started working and living in the development, it was clear that the ideals were lost in translation. People were

18 Montgomery, *Happy City,* 92.

"disoriented by the sameness of their residential complexes,"[19] and even started using the word *brasilite* (Brasilia-itis) to describe the eerie lack of life and joy within the community.

Following a certain amount of cynicism around utopic city design in the post-modern era, the pervasiveness of the obsession with happy cities cooled its heels. The last couple of decades hosts a resurgence, whether simply because of the cognitive neuroscience boom or a natural trend in history. Though the planning and architecture professions have separated quite a bit since the mid 20th century, dialogues are opening in the face of attitudes of multidisciplinary practice, consultation, and frankly an urgency felt - often personally - by the professions to fix our happiness problem.

Gated communities and co-living developments are either end of the same spectrum: architecture at a community scale intended to prescript or promulgate certain behaviours. The isolation and distruction exclusion of gated communities make them inherently antisocial, while co-housing and communal housing projects function "like friends around a table,"[20] forging strong and meaningful social relationships with neighbours. Gehl sees an increase in such projects in recent years, and given that people who feel they belong to their community and trust their neighbours report higher life satisfaction,[21] this marks a positive direction. Unfortunately, most of us live in existing urban and sprawl environments.

Problems, Problems, Problems

Because we've now come to a better understanding of how to define and measure well-being, census data can now utilize self-reported life satisfaction as a correlative indicator for psychological well-being. Several experts (such as Adli, Berry & Okulicz-Kozaryn, and Helliwell) are using this data to explore a phenomenon that has been instinctively understood but only recently verified: people who live in urban environments are actually reporting lower well-being levels than their rural counterparts. This phenomenon has been

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19 Montgomery, *Happy City,* 92.

20 Jan Gehl, *Life Between Buildings: Using Public Space*, trans. Jo Koch (Washington, DC: Island Press, 2011), 87.

21 Montgomery, *Happy City,* 134.

nicknamed the urban-rural happiness gradient.[22]

This phenomenon is a topic of debate, as data collection isn't uniform internationally, and causes for the phenomenon are as yet unclear. International investigations are recommended to solidify the research, especially given the rate of urbanization of the world.[23] For Canadians, an additional hurdle is a lack of implementation in the census of stringent measures for well-being and mental health. In April of 2015, however, Statistics Canada released a report of life-satisfaction ratings from recent years in regions and cities in Canada, controlling for individual-level characteristics so as to speculate on geographic differences in well-being. I used this data to evaluate whether or not the urban-rural happiness gradient was observable in Canada, and it appears to be. In Figure 3, I've taken the data and applied it to a map of Canada, where the coloured circles represent proportionally its region's life-satisfaction score. The blue circles represent economic regions (rural regions) and the red circles represent metropolitan areas (cities). For analysis, and where data is available, I've also applied a greyscale to geographical regions to indicate their density, with white being the least dense and black being the most dense.

There are two standout conclusions I draw from this data. The first is that population and density aren't guaranteed to predict happiness reports when comparing cities with other cities, but the second is that cities are consistently reporting lower life satisfaction than their surrounding economic regions. In other words, while the trend might not be obvious when only looking at cities, it is observable when relating cities to their immediate regions. In fact, all economic regions but two report higher scores than the national average.

There are a couple of contentious points worth discussing vis à vis this report. The first is that, despite being touted as the most liveable city in North America, Vancouver actually rates the lowest of all Canadian metropolitan areas for well-being. Again, the reasons for this are not yet known, but it highlights a theme that recurs in the case study analyses: often what we conceive as utopic places have the opposite effect on our well-being. Toronto has the largest population of the cities, and ranks second lowest for well-being. Next to consider is Montreal: the second-largest population, and the densest city in

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22 Berry and Okulicz-Kozaryn, "An Urban-Rural Happiness Gradient", 871-883.

23 Mazda Adli et al., "Science to policy: M8 Alliance invites policy makers to step in," *The Lancet* 378, 9801 (2011), 1447-1449.

North America, actually hovers at the national average for wellbeing (which includes the rural areas), making it anomalous among the general findings. We can only speculate as to why this may be, but being a Montreal native, I know how the city *feels*. It doesn't feel crowded, and what we will learn in Chapter 4 is that crowding is an issue of perception than of actual density.

So what is it about cities, despite their many and obvious benefits, that are making us less happy?

For answers we turn to Charles Montgomery's Happy Cities and Jan Gehl's Life Between Buildings. Both writers discuss 'happiness' in cities (or, more specifically, a lack thereof) and cite various conditions of the city which might explain this phenomenon. Montgomery's take on the subject is a little more reactionary than Gehl's. Montgomery touches on the history of suburbia and reverence of the automobile, social isolation, and perceptions of the city as culprits of this added stress. Gehl, on the other hand, grounds himself in sociology and human behaviour and concerns himself with the lack of social opportunities in the everyday spaces of the city. Many who dwell on this topic point to the environmental stressors in the city, but most of these seem to be a matter of perception, and spaces can be designed to affect perception.

Happy City by Charles Montgomery was foundational for this thesis. With a concern for how and why the built environment of cities could be negatively affecting its occupants, Montgomery cites well-being and physical health as goals for sustainable city design. He uses the same model of well-being as I've described, and we agree on the detriments of social isolation:

> But we should never forget this fact: even though the modern cosmopolitan city makes it easier than ever for individuals to retreat from neighbours and strangers, the greatest of human satisfactions lies in working and playing cooperatively with other people. No matter how much we cherish privacy and solitude, strong, positive relationships are the foundation of happiness. The city is ultimately a shared project, like Aristotle's polis, a place where we can fashion a common good that we simply cannot build alone. [24]

We also share views on the role of determinism in design: neither of us believes that the city could singlehandedly solve the puzzle of happiness, but it certainly plays a role and we owe it to ourselves to investigate ways the design of cities and spaces can help. We can at the very least rectify an obvious problem of the city: "Social isolation just

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24 Montgomery, *Happy City,* 41.

may be the greatest environmental hazard of city living – worse than noise, pollution, or even crowding." [25]

Montgomery's ultimate thesis is that the happy city goes hand-in-hand with the sustainable city; that our biggest social, political and economic problems can all be mitigated by the same city. As inspiring and ambitious as this thought is, the scope of this thesis focuses on the 'happiness' of cities primarily by reducing social isolation and secondarily through other dimensions of eudemonic well-being.

Jan Gehl's Life Between Buildings centers more on the behaviour of people rather than the systems of cities. Gehl's multidisciplinary understanding of what people need in terms of social interaction makes him a wonderful precedent for architects assimilating research and translating it into spaces. This particular work boils down to a thesis about architecture and public spaces providing opportunity rather than prescribing behaviour. If a space cannot provide opportunity for the most passing of social interactions, then it definitely will never host any meaningful ones. The importance of spending time in a public space around other people, feeling safe and passively involved, cannot be emphasized enough. This first gateway social context of course contributes to positive relations with others and a healthy social life, but also can contribute to environmental mastery: "We discover how others work, behave, and dress, and we obtain knowledge about the people we work with, live with, and so forth. By means of all this information we establish a confident relationship with the world around us."[26]

If we continue to pull at this thread with Gehl, we also discover the importance of human activity: our need for participating in it, our attraction to witnessing it, and perhaps most importantly the sense that human activity is surrounding us. "A summary of observations and investigations shows that people and human activity are the greatest object of attention and interest. Even the modest form of contact of merely seeing and hearing or being near to others is apparently more rewarding and more in demand than the majority of other attractions offered in the public spaces of cities and residential areas."[27]

Beyond the themes from Gehl's work that seem to tie effortlessly into the psychological literature, Gehl has assembled a series of studies and investigations that offer pragmatic spatial solutions which have contributed considerably to a translation of

25 Montgomery, *Happy City,* 54.

26 Gehl, *Life Between Buildings,* 21.

27 Gehl, *Life Between Buildings,* 29.

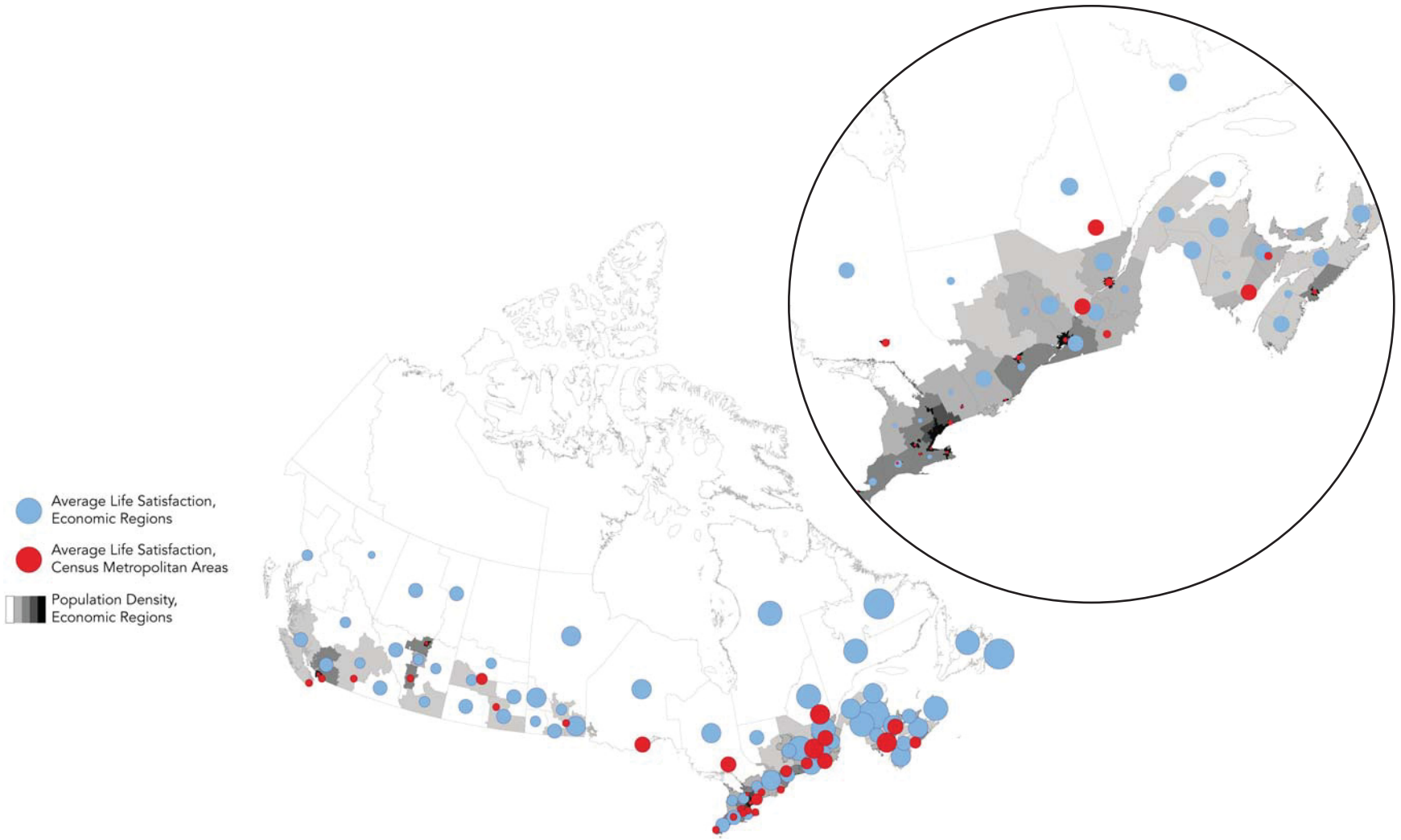

Fig. 2 Urban-Rural Happiness Gradient in Canada. Adapted from *Boundary Files, 2011 Census*.

multidisciplinary research into architecture.

Spatial Intersection with Eudaimonic Dimensions

How does one begin this translation? The design process is both individual and universal. The means by which each person operates varies, but the task is the same: to evaluate huge amounts of information and make design decisions accordingly.

A diagramming and mapping exercise was conducted to aid in the assimilation of a large body of research that pertains to how cities as a system impact people's behaviour. Each factor is often impacted by or related to another factor, and each, I posit, can affect one or more of the eudaimonic dimensions. This work serves to both elucidate and spatially diagram each factoid, and also visualize a systems map revealing the 'messiness' and intricacies of how cities impact our well-being.

The following figures are the diagrams and images associated with the aspects of the urban built environment that have been shown to impact on peoples' physical or psychological well-being. They will then be associated with each other and with the dimensions of eudaimonia as posited by Ryff (1989) in a concluding systems diagram.

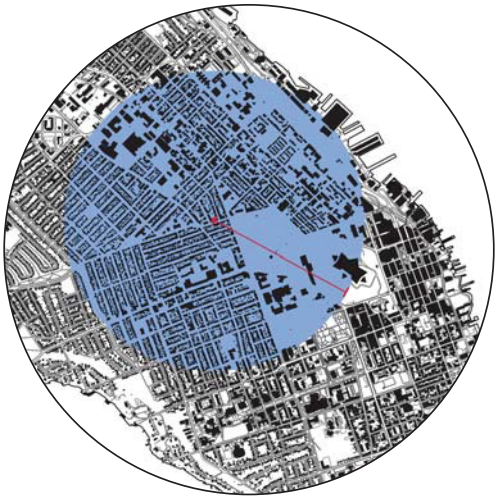

Fig. 3 Walkability. Adapted from *Building Outlines,* Halifax Regional Municipality Open Data.

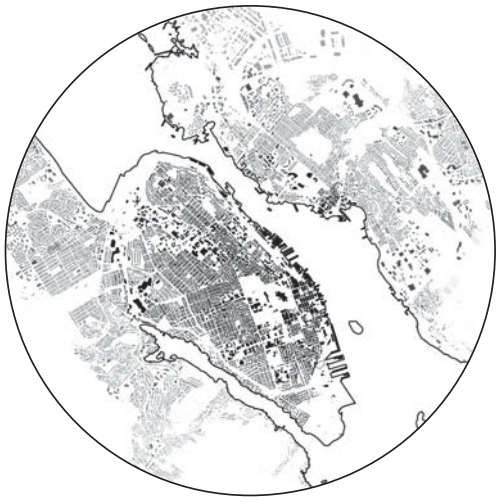

Fig. 4 Dispersal. Adapted from *Building Outlines* and *Zoning Boundaries,* Halifax Regional Municipality Open Data.

Fig. 5 Monofunctional Zoning. Adapted from *Zoning Boundaries,* Halifax Regional Municipality Open Data.

Walkability

Finding the Walk Score of a new neighbourhood has become a regular part of apartment hunting. Walkable neighbourhoods report happier occupants and better physical health, because people are more likely to walk outside. Besides the physiological benefits of both walking and being outside, the simple act of leaving the house ensures at least peripheral social interaction, and opportunity for spontaneous more meaningful social interactions.

Dispersal

The sprawl of cities is a major contributor to monofunctional zoning, automotive dominance, and ultimately results in destinationism. Dispersal impedes walkable neighbourhoods and increases the daily commute. All these things are shown to negatively impact health and well-being.

Monofunctional Zoning

Monofunctional zoning promotes homogeneity in the environment, contributes to the reliance on cars and destinationism, and ultimately strangles the richness of potentials of city life. Spontaneous social interactions are impacted, and zoning contributes to various forms of accessibility in the city.

Fig. 6 Green Spaces. Adapted from *HRM Parks,* Halifax Regional Municipality Open Data.

Fig. 7 Automotive Dominance https://pixabay.com/en/traffic-jam-traffic-highway-freeway-1703575/

Green Spaces

Besides social interaction, nature is the biggest environmental impact on psychological well-being. Green spaces do not need to be at the scale of Central Park or Trinity Bellwoods to have value. In fact, a more generous peppering of gestures throughout a city can have greater benefit (because they are not inherently destinationist).

Our brains are designed to scan, understand, and relate to the natural world, so it is the easiest and most pleasant thing we can put its attention to. More on this in Chapter 5.

Automotive Dominance

The spatial importance of the car in our cities is impossible to exaggerate. The very fabric of cities are woven on the loom of roads, highways, avenues, boulevards, streets, and laneways. These infrastructures precede the automobile, but were used in an entirely different way before its invention.

People - when out and about, pedestrians - ultimately have no agency over where they can safely walk or gather. Reduction in safety, control, and a contribution to environmental stressors all negatively impact eudaimonia.

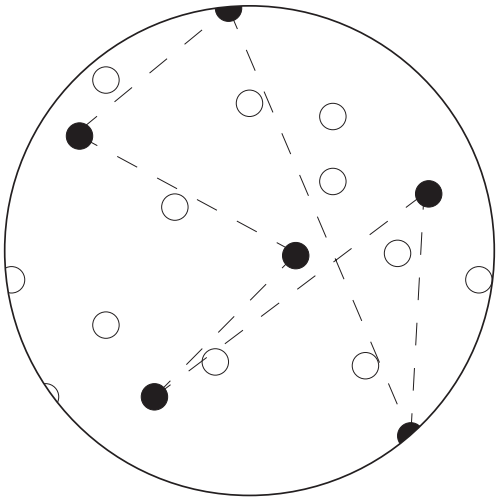

Fig. 8 “Destinationism”

Fig. 9 Spaces for Social Opportunity
Photograph by Willem Diepraam of the *Centraal Beheer Apeldoorn (1968-72)* designed by Herman Hertzberger. Available at https://www.dezeen.com/2011/12/06/key-projects-by-herman-hertzberger/

“Destinationism”

This is a term that I use to describe a particular phenomenon made worse by zoning and commute: when one has a task or activity to do, one has to travel to a specific place where that task or activity can happen, and each task or activity is a different place that must be travelled to.

This prevents any sort of social or environmental interaction between tasks - the black hole of the commute is extended beyond the work-home commute, and makes daily life more difficult and less enjoyable.

Spaces for Social Opportunity

This fundamental tenet of city life can be essentialized in the archetype of the agora, but Jan Gehl (among others) maintains that our needs are much more varied and subtle than a simple open square for gathering.

In our daily lives we need spaces that allow us to have both spontaneous and planned interactions, with strangers and friends, of varying lengths of time and meaning. Like green spaces, these should be peppered generously throughout a city.

Fig. 10 Sense of Community
Personal photograph from this author's archives

Fig. 11 Neighbourhood Identity
Photograph by Dennis Jarvis of *Theodore Tugboat at Myrphy's Cable Wharf, Halifax.* Available at https://commons.wikimedia.org/wiki/File:Theodore_Tugboat_at_Murphys_cable_wharf.jpg

Sense of Community

The built environment impacts our sense of community in ways we don't see - in the way we don't see the forest for the trees. The basic organization of our communities can foster a sense of togetherness or isolation. Safety and trust, which have been shown to be impacted by our built environments, contribute greatly to a sense of community. Moreover, a sense of community and eudaimonia form a feedback loop that is self-perpetuating.

Neighbourhood Identity

Narrative - a favourite theme of both cognitive neurologists and architects. It forms both individual and collective neighbourhood identity, which can strengthen community bonds and contribute to dimensions of eudaimonia in as many ways as there are narratives to imagine. Our brains are hardwired to find or assign narrative to our environment, and there are ways designers can suggest certain associations to influence that narrative.

Safety and Trust

A basic need for any cohesive community, safety and trust are greatly impacted by the built environment. Our brains scan around us all the time to assess potential dangers and exits. Oscar Newman's seminal "Defensible Space" helped make concepts like prospect and refuge part of every architect's lexicon.

Fig. 12 Safety and Trust
https://pixabay.com/en/security-camera-camera-security-834173/

Fig. 13 Religious/Community Access
https://pixabay.com/en/schladming-city-community-village-1636266/

Religious/Community Access

Here the term 'religious' is used not because the participation in religion in and of itself is the factor, but because it has historically been the primary social organizer for communities.

Having a central body - both in an idealogical sense and physical one - that offers gathering, support, social welcoming, and a sense of belonging is an invaluable resource of meaningful social interaction.

Further, a church or community center also offers opportunities for sociality at varying levels of meaning (from passing small talk to, say, sharing ideas about life's purpose or teaching a long-earned life skill to youth).

Physical Hierarchies

Physical hierarchies refers to tangible hierarchies such as street hierarchies (think traffic artery vs. residential one-way) or transit hierarchies (train vs. subway vs. bus). Hierarchies can affect eudaimonia through the narrative they describe, such as that cars are more important than people. They also offer cues to the brain that affects our navigation through the built environment.

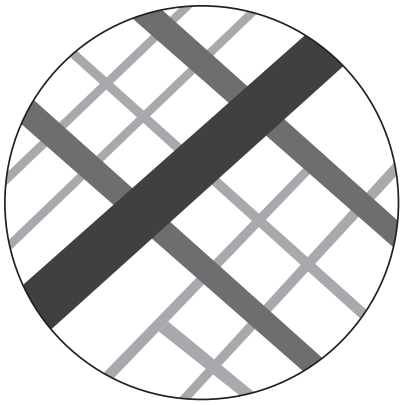

Fig. 14 Physical Hierarchies

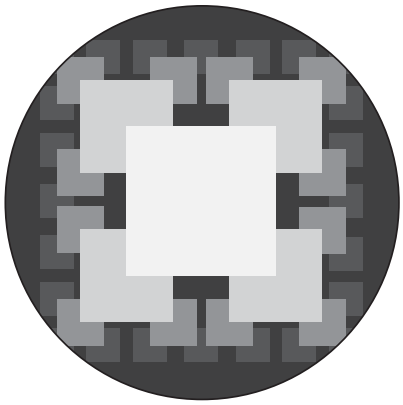

Fig. 15 Spatial Hierarchies

Fig. 16 Physical Quality of Built Environment
https://pixabay.com/en/lost-places-office-broken-1730891/

Spatial Hierarchies

Spatial hierarchies describe the less tangible (more phenomenological) hierarchies that, similarly to physical hierarchies, describe a narrative and offer cues for navigation.

The dense towers of a city, for example, imply centrality because of the increased density compared to the sprawls and medium-rise areas of the city. Imposing entrances in front of civic buildings implies loftier importance than the modest porch of a townhouse.

Physical Quality of Built Environment

Whether a Place is well kept or run down offers clues about how that area is doing. In a sense, we can tell if that area is a eudemonic community (is cohesive and trusting, therefore has low crime and healthier inhabitants) by its physical appearance. Of course, appearances can be deceiving, but it is clear that the brain associates “kept” with “safe” and “unkept” with “danger”.

Fig. 17 Light, Air, and Noise
https://pixabay.com/en/bicycles-summer-bikes-activity-405779/, https://pixabay.com/en/industry-sunrise-clouds-fog-611668/, and https://pixabay.com/en/plane-aircraft-take-off-sky-50893/

Light, Air, and Noise

Light, air, and noise are all what we term ‘environmental stressors’. These are aspects of our environment that can have a positive or negative physiological effect on us, in turn affecting our state of well-being.

To start with a painfully obvious statement: we like light, and we don’t like dark. To go beyond, we light variety in our exposure to light over the day - plays on shadows, bright direct light, and diffuse overcast light are all welcome. Being cast in the shadow of a 40-storey building all day is unpleasant and affects us greatly on a physiological level.

Air quality also has health implications, though they are more physical than physiological or psychological. Still, we know that physical health and eudaimonia are interrelated.

Noise polution is another stressor on the brain that causes us to release stress chemicals, impacting both our mental and physical states.

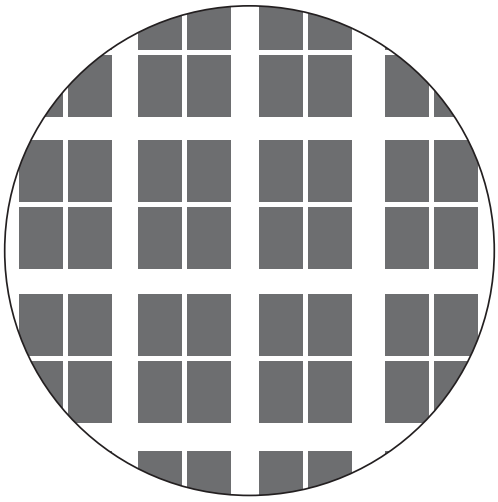

Fig. 18 Homogeneity

Fig. 19 Variety

Homogeneity

We hate when everything looks the same. It's not because architects are snobs that they bemoan developments of identical townhouses in the hundreds - it's because the brain struggles to differentiate, categorize, and assign meaning to homogenous environments. These things are all necessary for us to feel safe and to be able to navigate, not to mention our desire and need for narrative.

Variety

On the other hand, we love variety. Interesting streetscapes with different storefronds and window dressings, winding roads, and novel vistas of geographies we only see when travelling are all wonders that stimulate the brain in positive ways.

Variety is, quite literally, the spice of life, and without it our brains would drown in their own ennui, unable to conduct its constant scanning, organizing, narrating, and delighting.

Sharp Spaces

Sharp spaces refers to spaces with hard edges, sharp angles, and anxiety-inducing corners.

It's still not entirely clear why the brain despises these forms, but brain scans show

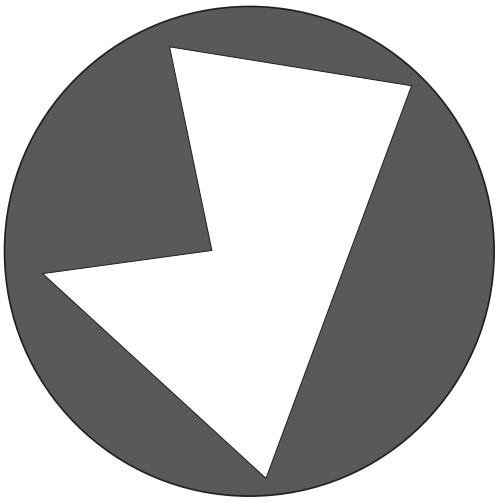

Fig. 20 Sharp Space

Fig. 21 Soft Space

clear preferences for soft spaces.

It is thought that one of the reasons might be that sharp spaces offer greater opportunities for lurking danger, and thus cause anxiety on a chemical level.

Soft Spaces

On the other hand, the brain is calmed and oriented in soft spaces. Curves, gentle slopes, and womb-like corners are all easy for the brain to digest. Soft spaces even produce the chemical reactions of euphoria in the brain.

Some midcentury philosophers might attribute our fondness for soft spaces to the attraction of the female form, but today's scholars know better.

Human Scale

Human scale is an aspect of design that, much like the utopic city, has been a discussion since as early as we have historical records.

Vitruvius, Galileo, Le Corbusier, and most recently, ergonomics scientists and kinesiologists have all dedicated their brain power to defining the human scale and promulgating its importance in the design of objects we use and environments we inhabit.

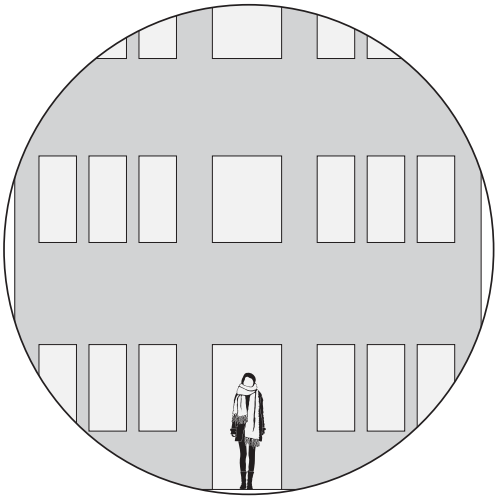

Fig. 22 Human Scale A

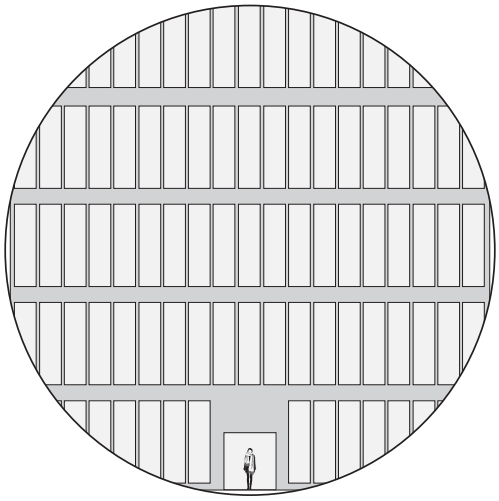

Fig. 23 Human Scale B

Some of the theories are simply theories, while others are more empirical.

The Golden Ratio, for example, actually seems to hold as a ratio that delights the brain. The ratio, roughly (but not exactly) 3:2, has been used since the Greeks and can be overlaid on almost any historical monument. The theory is that 3:2 also roughly describes the human viewport, and anything within that ratio *feels right* because it is easy to scan and process by the brain.

Overcrowding

Overcrowding is a danger of city life that actually has nothing to do with density (people/area) but rather with our perception of how many people near us is too many to feel comfortable and safe.

Sensing that we have no choice in whether or not to be in proximity to others is the true culprit of overcrowding, which can negatively impact our socializing and sense of envrironmental mastery.

Isolation

Conversely, isolation is also a danger of city life. It is the sensation that occurs when there are not enough opportunities for positive and spontaneous social interaction.

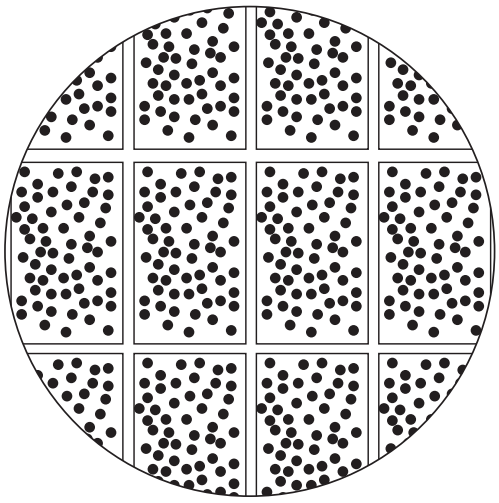

Fig. 24 Overcrowding

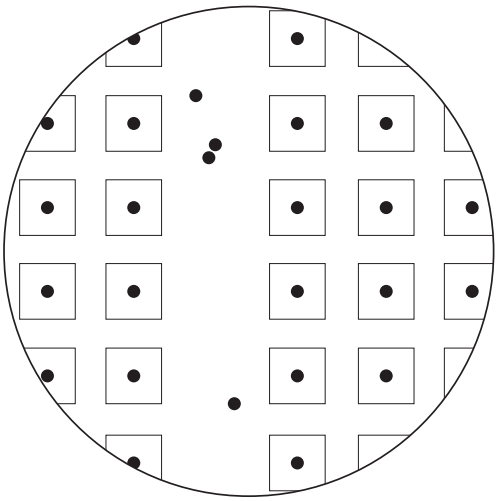

Fig. 25 Isolation

Living alone, for example, isn't inherently going to cause isolation. But living alone on the 36th floor of a tower of bachelor apartments whose only shared space is a laundry room and the elevators is definitely going to cause isolation.

The most successful dormitory projects are ones that balance the risks of crowding and isolation.

Accessibility

Here, accessibility refers to a whole slough of factors that are sometimes architectural in a morphological sense and sometimes architectural in the sense that the process of building, legislating, or distributing the built environment is architectural.

Having basic physical access (i.e. barrier-free design), infrastructure and amenities, and smartly designed public transit systems all result in communities that report higher psychological well-being.

Segregative accessibility refers to a myriad of social and political issues that sometimes manifest architecturall (here is picture the Berlin Wall as an example). Serious sociopolitical crises have intense impacts on the mental and physical health of those affected.

Financial accessibility refers not to whether or not a person has money, necessarily,

Fig. 26 Accessibility
Segregative: https://pixabay.com/en/berlin-streets-bike-berlin-wall-453301/. Ameneties: https://pixabay.com/en/shopping-supermarket-merchandising-1232944/. Commute: https://pixabay.com/en/bus-inside-empty-city-1263266/. Physical: https://pixabay.com/en/disabled-disabled-access-wheelchair-397192/. Financial: https://pixabay.com/en/mansion-house-home-real-estate-875094/. Psychological: https://pixabay.com/en/boy-person-looking-out-window-984313/.

but how much control their finances afford them. Renters feel less environmental mastery than owners.

Finally, psychological accessibility refers to all the growing literature on how the built environment is shaping our minds which we discuss in this report.

The systems of cities and happiness

Our final figure in Chapter 3 describes the systems of all of these factors working together to impact our psychological well-being, or eudaimonia.

This exercise demonstrates the interconnectedness of every factor; the larger picture is as complicated as the brain itself. While it would be impossible to try and incorporate each factor individually in an urban design for eudaimonia, some clear themes are beginning to emerge.

At this scale of thought, which is to say a more conglomerate or urban one, the themes of sociality, community, narrative, and safety emerge. We will remember this in Chapter 5 when the Principles are described in detail.

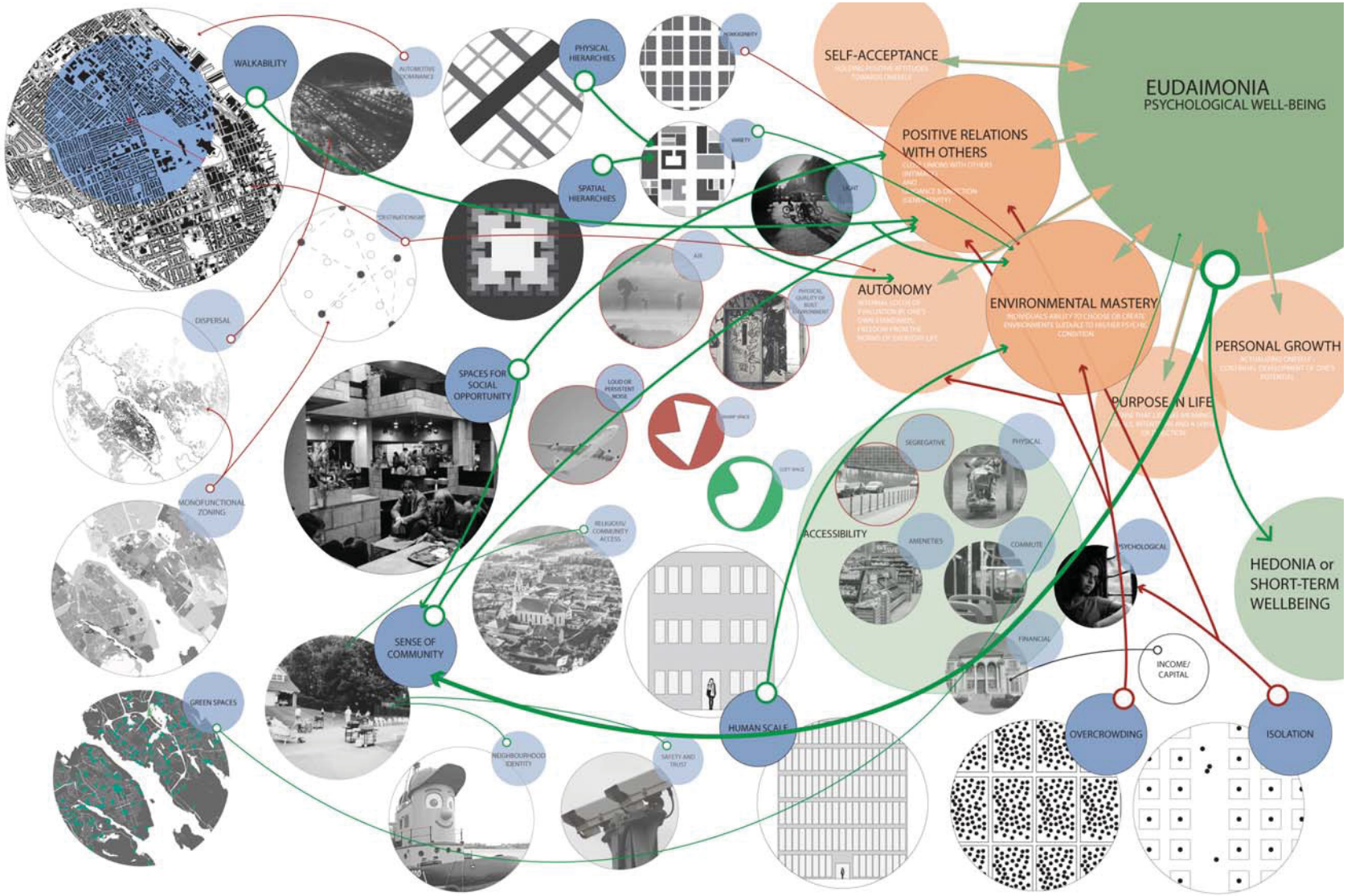

Fig. 27 Eudaimonia and the City, Systems Diagram

Chapter 4: Brain Scale

Space and Feeling

The act between space and feeling is, in scientific terms, cognition, and in philosophical terms, perception. We perceive the space around us and subsequently we feel things.

Phenomenology has been a long time ally of the architect, as both are behaviourists by nature. Phenomenologists help architects qualify their instincts about space and behaviour. Before developments in sociology and psychology that allow us to empiricize behaviour, we relied heavily on theorizing when it came to 'how spaces make us feel'. As architecture is as much an art as it is a science, this is a valid (if not incomplete) form of research.

Gaston Bachelard's "The Poetics of Space" deals with the feelings of the home in particular - and echoes a lot of the later empiricized findings of environmental behaviourists and cognitive scientists. Where do we go to feel safe, and what are the qualities of that space that contribute to our feeling of safety? Where do we go to be inspired? Bachelard's archetypal discriptions of corners and nooks, or the attic, communicate poetic qualities of those spaces that make us feel, for example, safe or inspired. Interestingly, we can also describe the feelings of safety as products of prospect and refuge, and feelings of inspiration as tied to ceiling height and physical elevation. Prospect and refuge, a concept put forth by Oscar Newman in "Defensible Space", refers to a duality that makes us feel safe and is spatially defined: a broad, open view ahead (prospect), and a wall to our backs (refuge). Environmental behaviour science empiricized and coined the term, but the instinct and spatial quality was nonetheless described by Bachelard as 'corners' in the home that we assign importance to. Even being within the home and gazing out at the weather conditions can emphasize these feelings of safety, "for our house is our corner of the world."[28] Further, Bachelard describes the attic as the room of dreams and rationality, where one looks outward and upward (as opposed to the basement where one looks

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28 Gaston Bachelard, *The Poetics of Space* (New York, USA: Penguin Books, 2014), 26.

inward at the emotional). Recently, neurologists have found that the height of a room impacts the quality of our thoughts in it (remember that Louis Kahn quote: “In a small room one does not say what one would in a large room.”) Tall ceilings cause loftier thoughts - big-picture stuff - while shorter ceilings cause focus on detail and procedural work. Less obviously phenomenological authors have also theorized about behaviour that has later become accepted scientific phenomena. Michel de Certeau in “The Practice of Everyday Life” emphasizes the important of the innocuous, of *le quotidien* and its impact on our sense of self and even our political organizations. Meanwhile, the effect that everyday activities has on our well-being has been studied through many facets. The need for a variety of social interactions daily, variety in the environment, and sense of community and meaning are all impacted by the types of activities we participate in daily as well as the spaces in which we do them.

Contemporary Phenomenology and Cognition: a Marriage

More recently, architectural critics and writers with phenomenological leanings have been cooperating with and learning from their cognitive counterparts. This theme of works takes a firm stance in its attitude towards the application to architecture. Where previous rationalist movements at best ignore and at worst condemn the artistic, emotional, and intuitive, today’s critics of space and feeling firmly believe in the balance of the empirical and the intuitive. Juhani Pallasmaa, for one, discusses the artist as neurologist, and includes the architect in this likening:

> Works of meaningful architecture intuitively grasp the essence of human nature and behavior, in addition to being sensitive to the hidden biological and mental characteristics of space, form and materiality. By intuiting this knowledge, sensitive architects are able to create places and atmospheres that make us feel safe, comfortable, invigorated, and dignified without being able to conceptually theorize their skills at all.[29]

Earlier the point was made that the architect’s intuition was simply not adequate, within the context of functionalism. To be clear, this stance stlil holds, but it holds only in defining the structures and frameworks of solutions that the architect can effect. The ‘how’ of design and the haptic moments belonging to the whole can and, perhaps, should be freely intuited

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29 Pallasmaa, *Mind in Architecture,* 68.

to whatever degree the architect so chooses.

To elaborate: consider the structure of the brain. The two hemispheres, we know, are concerned with different modes of thought and being. The left hemisphere is associated with the rational. It is focused, and analyses things in an isolated manner, removed from context. It is explicit. It makes decisions instantaneously, and is angered when challenged. The right hemisphere's strengths temper and balance the inherent flaws of the left. The right hemisphere is all about the big picture, context, and relationships. It draws links and can understand 'grey area'. It deals with language and metaphors, and seeks novelty in everything that confronts it.[30] Either half, singly, will fail where the combined full brain will succeed. Similarly, an approach that is either wholly empirical or wholly intuitive is doomed to fatal flaw, where a balanced approach can balance each aspect's failings and bolster their strengths.[31]

While we might not yet have a full understanding, scientifically, of how emotion works on a cellular level, we do know "that the same nerve chemicals and cell processes that create mood and imbalances of mood are also involved in our perception of the world around us."[32] In the face of all the evidence, to argue that the built environment designed by architects would have no impact on the mind, our feeling, our behaviour, and our well-being is willfully ignorant.

Environmental Behaviour

Environmental behaviour science and/or environmental psychology are fields that blossomed in the 21st century and offer empirical evidence for certain design decisions

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30 Iain McGilchrist, *Mind in Architecture: Neuroscience, Embodiment, and the Future of Design* (Cambridge, MA: The MIT Press, 2015), 102-105.

31 Interestingly, Iain McGilchrist further describes periods throughout history whose social, artistic and intellectual zeitgeists favoured either side of the brain or balanced them. Currently, we are favouring the left side, losing the big picture to seperate itemized rules in every aspect of society: technology, politics, art, social concerns... "It is our current technical, disembodied, and dehumanized view of the world that is foreign to all other cultures and eras of human history" (p. 108). McGilchrist does not absolve the current state of architecture and architectural pedagogy of this trend.

32 Esther M. Sternberg, *Healing Spaces: The Science of Place and Well-Being* (USA: First Harvard University Press, 2010), 15.

that are of a more sociological nature than similar fields. Many helpful factoids and simple rules are learned from these scientists, particularly when it comes to organization of space and dimensions.

Environmental behaviour teaches us that hospital patients with a window view of nature heal faster,[33] or that non-linear dormitory organization caused students to experience less stress and built better friendships.[34] Certain seats in a straight-row classroom inhibit participation.[35] Overcrowding is entirely a matter of perception,[36] as is the concept of 'spaciousness' and safety. Appropriate social distance, sidewalk widths, the effects of transparent materials compared to opaque ones, and even the types of events or forms likely to speed or slow pedestrian traffic are helpful tools gleaned from decades of specific and intentional investigation. Much of the current research in neuroscience and psychology can be considered environmental behaviour science, but with a manifold increase in background knowledge and measurement tools.

Historical and Contemporary Projects

There are, of course, built projects that elucidate concepts discussed in both Chapter 3 - at community scale - and Chapter 4, at brain and individual scale.

Perhaps the most (in)famous example of architecture seeking to control behaviour is the Panopticon, conceived by Jeremy Bentham in the 18th century. The central 'eye', acting as surveillor and enforcer, looking out radially into every prison cell, is famed for its efficacy. Prisoners have no privacy, and yet are completely isolated. There is no guarantee that the central guard is watching at any given moment, but he could be. Rather than discuss the following social implications and philosophic anaylses throughout history, let us focus on the morphology of the design in terms of its effect on the inmate's dimensions of eudaimonia. As a reminder, these are self-acceptance, positive relations with others, autonomy, environmental mastery, purpose in life, and personal growth.

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33 Sternberg, *Healing Spaces,* 215.

34 Montgomery, *Happy City,* 130.

35 Sommer, *Personal Space*, 119.

36 Edward Krupat, *People in Cities: The Urban Environment and its Effects*, Cambridge Series in Environment and Behaviour (New York: Cambridge University Press, 1985), 100.

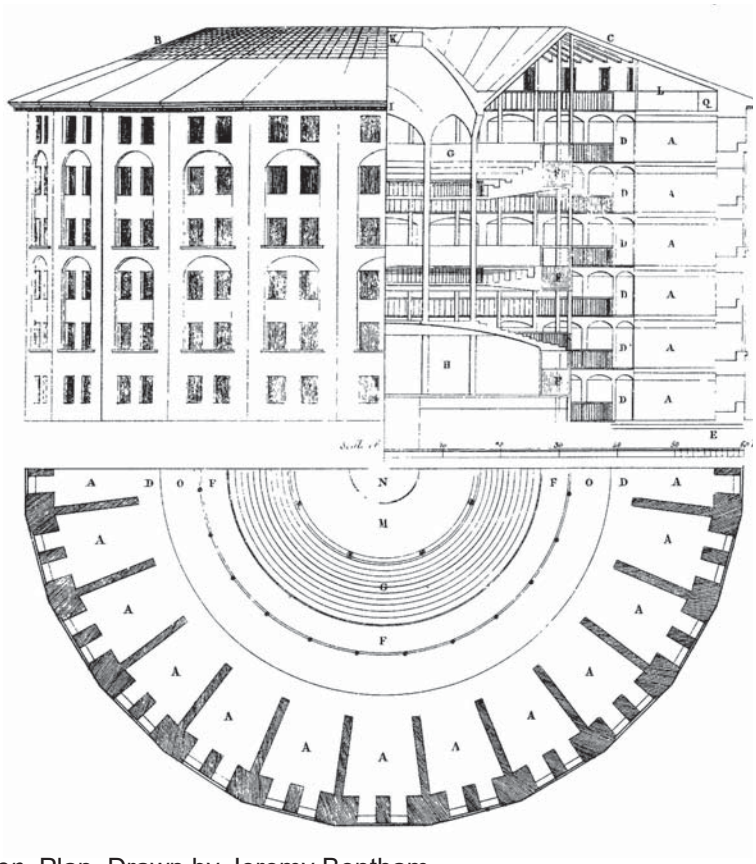

Fig. 28 *Panopticon*, Plan. Drawn by Jeremy Bentham.
Image available at https://commons.wikimedia.org/wiki/File:Panopticon.jpg

Firstly, it should be noted that simply being imprisoned in a single room without agency over one's escape is an obvious negative impact on all dimensions of well-being. Much of the negative impact of this space is, perhaps obviously, the result of a lack of control and a complete power imbalance. It is not simply that the prisoner has no control or power, but also that his only view of any interest is directly of the guard, who has all the control and power. The prisoner literally cannot escape his predicament, not just physically, but existentially.

Further, the form offers a sort of... reverse prospect and refuge. While each cell is sort of nook-like, the view it offers is not expansive and instead focused. The prisoner cannot see any environmental happenings outside of this narrow view - negatively impacting environmental mastery to a huge degree, and no doubt the cause of anxiety. The back wall is a curved form, but the dimensions, materiality and form of the rest of the cell are restrictive, unconfortable, and sharply angled, another cause of anxiety in the brain

- signals of danger. Prisoners cannot see each other or communicate in any meaningful way, completely removing any chance at a positve social relationship, and meanwhile there is nothing but fear, resent, and animosity towards the central tower. There is no purpose in life other than to be constantly monitered - there are no recreational areas in the building designed to house any program other than the simple one described above, and the stark walls and singular view only emphasize this knowledge.

Bafflingly, hospital design relied on the panopticon form for many decades. Given what we know now about the architecture of hospitals and healing, this would be laughable if it was not so shocking. One can perhaps forgive the move in the context of a nurse's station needing quick access to all patients and ability to supervise, but this consideration is not the only one to be made in the scheme of patients' recovery.

On the topic of healthcare, the Hogeway Dementia Village designed by Molenaar&Bol&VanDillen in the Netherlands, near Amsterdam, is a fully operational care facility geared to the elderly suffering from dementia, Alzheimer's, and similar conditions. The nature of these conditions are such that short-term memory, chronological sequencing, and orientation. Partly the result of careful research into the care of Alzheimer's patients, and partly an experiment in and of itself (simply by nature of its then-novelty), the village marks a paradigm shift in the attitudes towards the physical and social environments in which the patients are treated.

Previously, treatments have been isolating, and occur in hospitals and the like, where surroundings are unfamiliar to the daily life of the patient and causes disorientatiion, which in turn can cause potential trauma psychologically or physically. This treatment strategy is also very taxing on the staff, and as a result difficult patients will be further isolated and even restrained just so the staff can manage them. This, of course, can worsen the difficult patient's condition because the lack of social engagement atrophies necessary parts of the brain: "a study from the journal Nature Neuroscience found that isolation actually reduces the production of myelin—a fiber that maintains our nerve cells".[37]

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37 Josh Planos, "The Dutch Village Where Everyone Has Dementia", *The Atlantic*, Nov. 14, 2014, https://www.theatlantic.com/health/archive/2014/11/the-dutch-village-where-everyone-has-dementia/382195/.

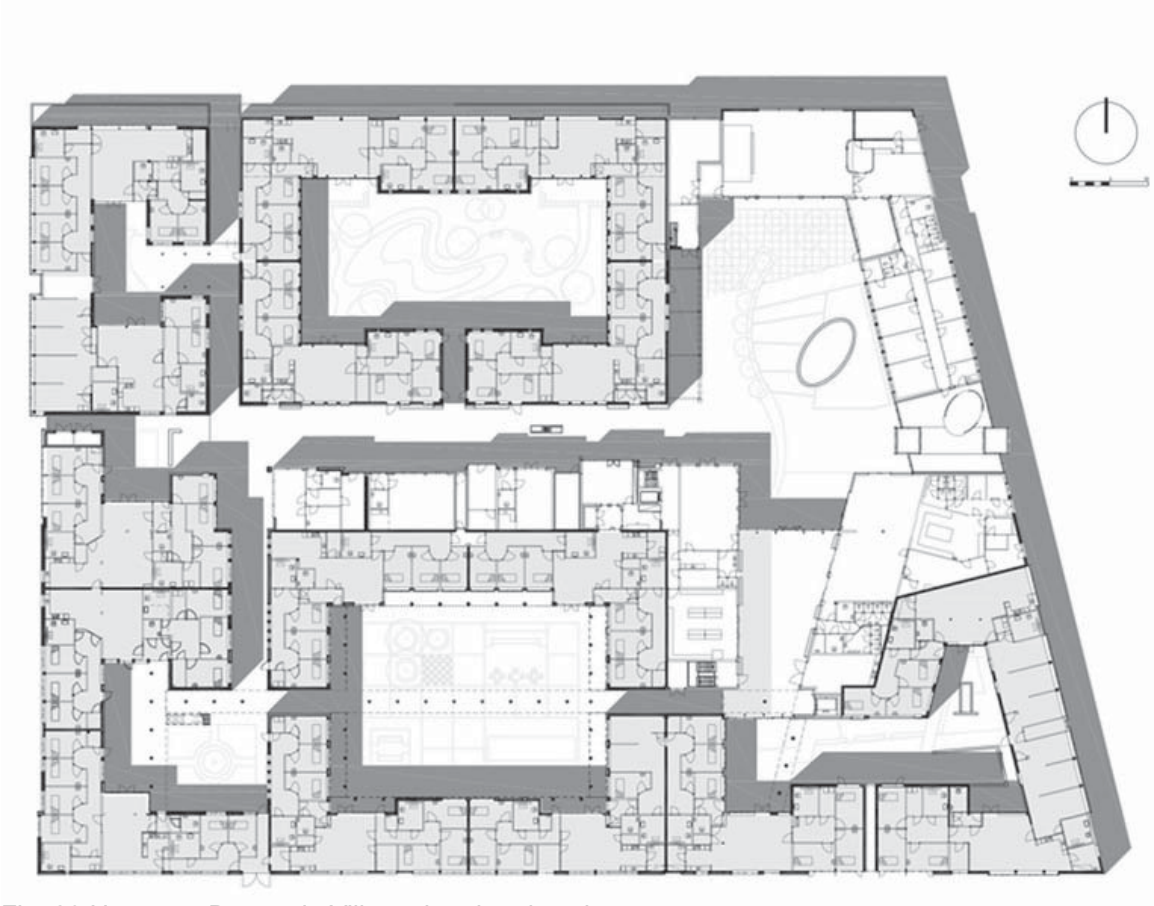


Fig. 29 Hogeway Dementia Village: interior plan view
Drawing by Molenaar&Bol&VanDillen architekten, Available at https://www.detail-online.com/article/dementia-village-de-hogeweyk-in-weesp-16433/

The Hogeway village, on the other hand, is designed in a superblock as a self-contained mini village with normal bungalow-like residences for patients, a small handful of nicely designed pedestrian streets to navigate, and normalizing ameneties such as a grocery store, a bar, and a theatre[38]. Here, patients are not confronted with unfamiliar surroundings, or constant environmental indications that they are unwell: another source of stress on dementia patients. The patients live in almost dormitory-style bungalows, with 8 or 9 residents per unit. Most importantly, the public space designed between the buildings are entirely safe and designed for the urge dimentia patients have to move around and explore: they can roam around safely outside in an environment familiar to the culture and with plenty of little haptic spaces for socializing.

38 Isabelle Rupprecht, “Dementia Village ‘De Hogeweyk’ in Weesp”, *Detail Magazine*, Sept. 6, 2012, https://www.detail-online.com/article/dementia-village-de-hogeweyk-in-weesp-16433/.

This project's value as a precedent lies in the effective resolution of a carefully considered problem, largely through the design of the public space of the project. Aspects of well-being typically denied or negatively impacted by traditional dementia housing and treatment were clearly identified, and the unique needs of the patients addressed in a humane and impactful manner. Wayfinding, a mixture of complexity and organization, a healthy injection of green spaces, and plenty of opportunities for social interaction are all tools that have eudemonic consequences. Revisiting the plan below (Fig. 30) after considering the principles of eudemonic design proposed by this thesis confirms their value. Though this precedent is for a very specific group of people, many of the considerations for the well-being of dementia patients are pronounced versions of those for the well-being of the general population.

A final theme in helpful case studies is the study of successful pedestrian streetscape design; streets once full of automobile traffic fully redesigned as pedestrian public space. These are helpful, even where the design or discussion is not explicitly

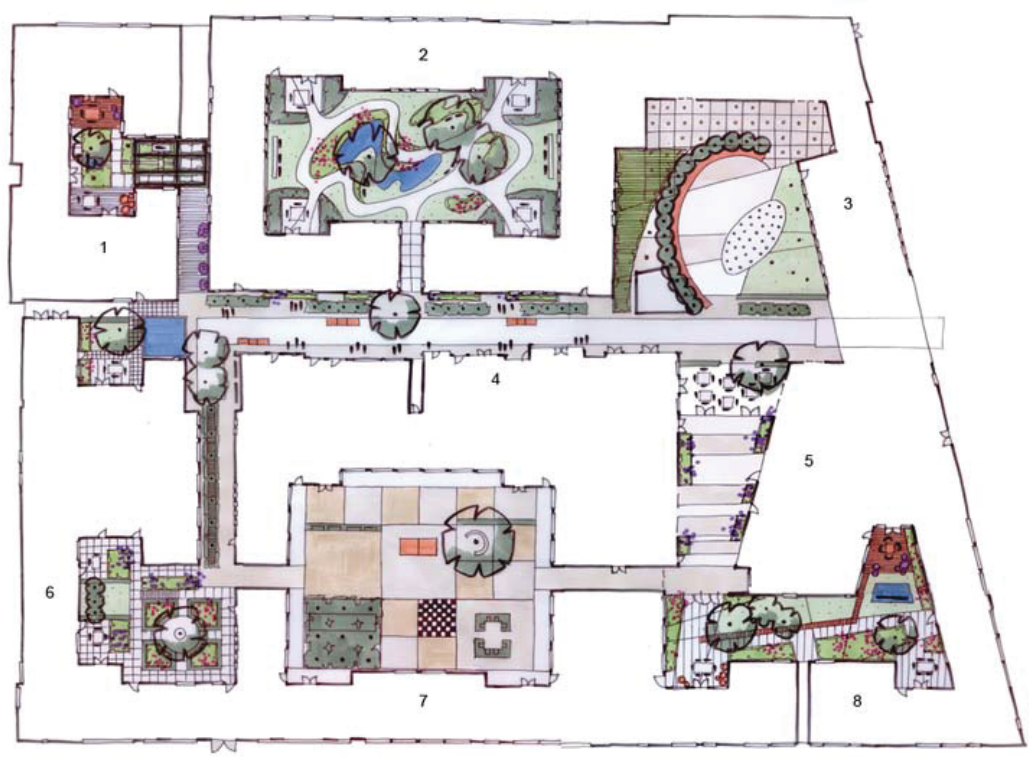


Fig. 30 Hogeway Dementia Village: site plan and public space
Extended boulevard (1); 'Vijverpark' (pond park) (2); Theatre square (3); Boulevard (4); Passage (5); Square with green area (6); 'Het Grote Plein' (large square) (7); 'Oosthoek' (eastern corner) (8), drawing: Niek Roozen, Weesp
Available at https://www.detail-online.com/article/dementia-village-de-hogeweyk-in-weesp-16433/

related to our allied fields, because ‘lively streets’ are symptomatic of communities with high well-being. The High Line in New York City, for example, gives autonomy back to the pedestrian by removing them from the dangers of vehicular transportation (granted, the high line is a transformed train track rather than street, but the point stands). It is more than a park. It provides an alternative, more pleasant pedestrian through-way, acts as a wayfinding landmark, offers plenty of green space, and provides a variety of opportunities for activity and different degrees of social interaction. Its scale is more accessible than Central Park. It would be a park that locals would use daily, rather than a destination for compartmentalized ‘green time’. An occupancy study focused on the eudemonic dimensions of the surrounding community would be invaluable.

A portion of a street in Montreal’s Plateau neighbourhood, Rue Prince Arthur, was famously pedestrianized in the early 80s, though it was often closed temporarily in the summers previous for special events. The pedestrian part itself runs only 5 or 6 small blocks, between traffic-heavy and nightlife-busy St Laurent Boulevard and a medium-sized formal park named Square St Louis. Its cross streets serve quiet one-way residential streets, and delivery vehicles or police cars can still access the pedestrian portion. Throughout its pedestrianized history, the street has been both extremely lively and desolate to the point of municipal intervention.

Here are three images (Figs. 31, 32, 33) of activity on Rue Prince Arthur in 1976, posted by local historian Robert Wilkins in a public Facebook group called ‘Montreal - Now and Then’. These images were taken before the street was transformed into a pedestrian mall, and it is clear that there is a yen for such a concept within the city. People are gathering, strolling, and socializing. If one looks closely at the banners hung over the street, one can read “Des rues pour vivre!” or “Streets for people”.

Following the transormation of this same stretch of the street into a pedestrian mall, you’ll find that, spatially, there was almost zero change from a street designed for cars. One can see that the biggest changes (besides a handful of planted trees - half of which have been removed and not replaced) is that the sidewalks and roads have been leveled, and the asphalt has been replaced by grey stone tiling that might as well be asphalt, and the sidewalks replaced by similarly sized reddish stone tiling, meant to demarcate the

Fig. 31: Summer 1976 on Rue Prince Arthur. Photo by Robert Wilkins.

Fig. 32: Summer 1976 on Rue Prince Arthur. Photo by Robert Wilkins.

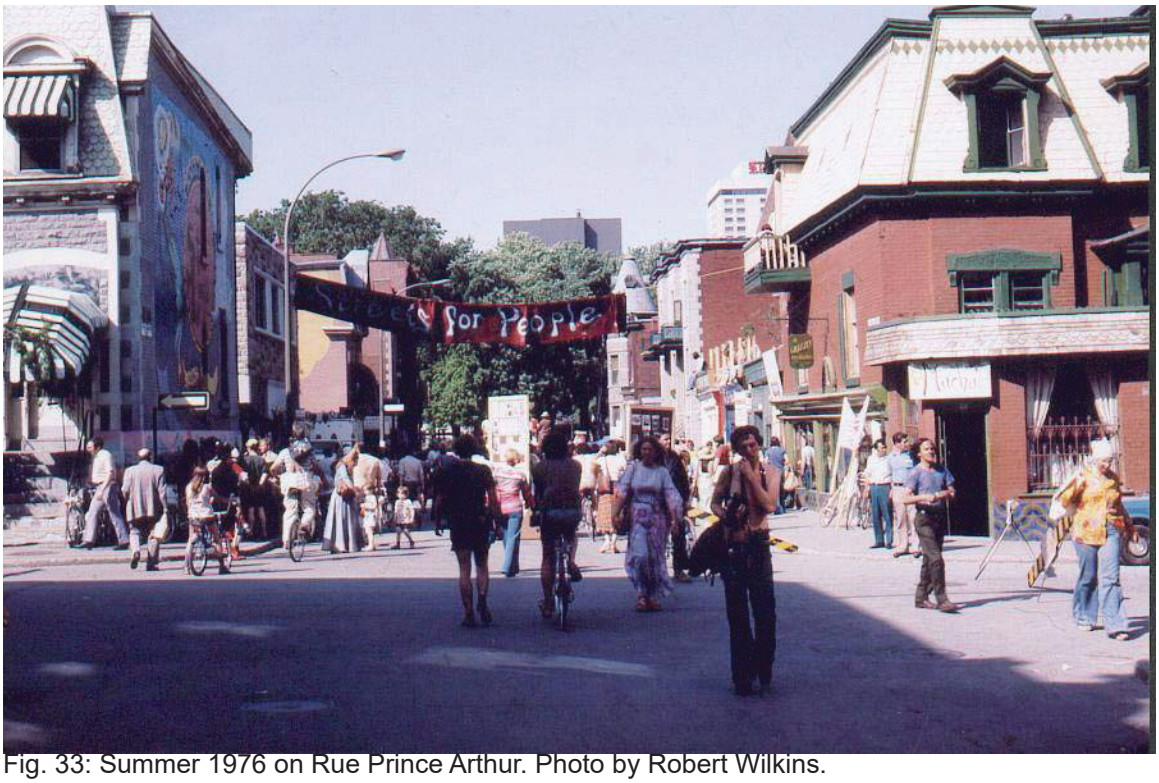


Fig. 33: Summer 1976 on Rue Prince Arthur. Photo by Robert Wilkins.

areas restaurants may use for their summer terrasses, which spill life into the road. The problem is, over the years, the business have closed. The space itself is not designed in such a way as to draw people in: the ‘pedestrian mall’ relies heavily on the commercial and restaurant business to draw foot traffic. The more these businesses failed (because their flourishing depended on the success of the street, rather than the other way around) the more desolate this street became. About 5 years ago, when I lived a block from the St Laurent mouth of this corridor, I was not drawn to use this street as anything other than a shortcut to the metro station on Rue Ste Denis, on the other side of the park. In the winter, despite what one would assume is easy access for the plough, the snow and ice made the street difficult to walk on.

Let us now review the architectural conditions of the street that both positive and negatively affect how people feel, navigate, and use the space.

Let’s start with the good. The mere fact that no automobile traffic is permitted along this portion of the street gives control and safety back to the pedestrian. Not relegated to the side, no danger in crossing the street, and generally made to feel as though pedestrians are important. This would have a positive affect on one’s self-acceptance, autonomy, and

environmental mastery dimensions of eudaimonia. One end of the street is capped in a medium-sized designed park, Square St Louis, which has a small octagonal hut housing a coffee and ice cream shop, and a large fountain around which locals often gather. In Figure 35 below, part of a presentation by AECOM to the public regarding renovations to the street in the last year, you can see Square St Louis as the dense grouping of greenery in the top left. Nature and greenery incorporated into design is shown to be a huge benefit to both individuals and communities. The scale of the buildings are, for the most part, non-intimidating, and at 2-3 stories do not loom over the street or block sunlight. There is

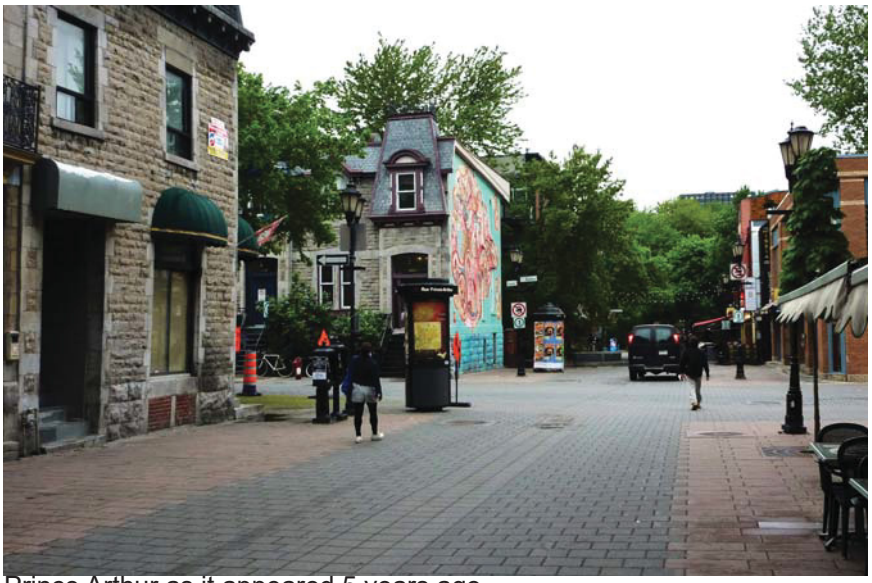


Fig. 34 Rue Prince Arthur as it appeared 5 years ago

a regular rhythm to the cross streets that offers a sense of structure and order, positively impacting navigability and environmental mastery. The building faces are varied, non-homogenous, and mostly windowed for commercial or restaurant use. This makes the environment interesting enough for the brain, and provides plenty of peripheral sociality even if simply passing through: one may not be stopping for a coffee but it nonetheless is a positive impact to be able to see others conducting activities around us. The width of the street itself is a good width: at about 20 metres distance, people can read each other's moods and feelings.[39] Being able to do so on this street, whose widest section is about

39 Gehl, *Life Between Buildings*, 65.

15 metres, is good for both socializing and for feelings of safety and trust. The rhythms of the paving - where the paving changes colour, pitch or texture - are just slightly wider than 3 metres, the maximum distance at which normal conversations typically take place.[40] In narrower portions of the street these would be 3 metres. Designs with these social distances throughout help ensure that the spaces provide opportunity for socialization at varying degrees of interaction. Further, the length of the jaunt is just over half of what is deemed a comfortable pedestrian distance for daily outings (the street measures 280 metres, and this maximum pedestrian distance is 400-500 metres).[41]

On the other hand, there is plenty in the morphology and social condition of the street that has contributed to its decades-long underutilization. For one, the street section shown in Fig. 36 is the street section along the whole length, varying only slightly in width from 15 metres to about 12 metres in some places. There isn't a lot of interest here, and a long, bland, straight corridor is experienced as a longer path than the same physical distance with a little bit of winding, some changes or sections throughout, and some visual interest.[42] We described the storefronts as being varied and interesting, but here I'll add a caveat: many of these business are vacant, implying a narrative of undesireability and sending social signs of warning. If you refer again to Fig. 35, you can see that while at

40 Gehl, *Life Between Buildings*, 67.
41 Ibid., 137.
42 Ibid., 137.

Fig. 35: From an AECOM public presentation: massing of Prince Arthur Street

one end of the street, the buildings are only 2 or 3 stories high and the mouth of the street opens into a pleasant park, the other end of the street features a dominating tower and an extremely traffic-heavy Saint Laurent Boulevard. The tower, which is on the south side of the street, casts a shadow on that whole corner of Prince Arthur for the majority of the day, and its imposing scale does not invite comfortable, casual pedestrian occupancy. Beggars, environmental activists, and blood donation recruiters all vie for the attention of pedestrians walking up Saint Laurent, causing most people to rush quickly past the mouth of Prince Arthur. Because Saint Laurent Blvd is both highly trafficked and a nightlife quarter, police vehicles often park in the mouth of the pedestrian street for easy patrolling and availability to respond to any calls. Depending on one's personal narrative with the police force, this can have the opposite effect of feelings of safety - particularly in Quebec where protesting and activism are culturally ubiquitous. Drawing on personal and anecdotal experiences from myself and female peers, women do not feel particularly safe walking along Prince Arthur at night, particularly (and perhaps, to some, counterintuitively) on weekdays when there are fewer eyes on the street. This is partly because of its underutilization, and partly because it is poorly lit. There are quiet cross streets, back alleys, and a few nooks that the brain scans as potential danger zones.

AECOM's presentation, dated September 2015, offered two redesigns of the pedestrian mall, accepting that ths street's underuse and business failure was effect of design. and one of the proposal concepts was, in fact, chosen and implemented in the last year. It has been largely criticized, mostly by tbe business owners on the street, and is generally not considered a success. The proposal, show in plan view in Fig. 37, seems benign enough on paper. Citing several successful "centralized" streetscape projects in Europe, the theory is that the slow traffic and social programming would occur in the central strip once used by cars, and the sides would remain "sidewalk-y". This isn't fundamentally that different than the current spatial organization: the 'open space' continues to feel exposed and surrounded by the 'travellers'. It is nonetheless an improvement: much more greenery, street furniture that allows for gathering and different forms of social interaction, and the addition of a healthy amount of visual interest for passers-through. Perhaps at least some of the frustrations of the business owners stem from the lost business related to ongoing construction and poorly planned implementation.

Fig. 36 From an AECOM public presentation: street section of Prince Arthur

Comparing this proposal, which is nonetheless an imperfect improvement, to the second, unbuilt proposal is useful for the comparison of interventions from a eudemonic architecture point of view. While the first proposal was called the ‘centralizing’ proposal, the second is dubbed the ‘ambulatory’ proposal. Here, the ‘activity’ portion is designated at the edges of the streets (and terrasses would be immediately outside of restaurants) and the central portion is the circulation corridor, but rather than being a straight shot, it is wavy and varies in width along the length of the street (see Fig. 39). AECOM compares each proposal using a slough of qualitative categories such as ‘dynamic potential’, ‘ease of implementation’, ‘amount of greenery’, and ‘ease of upkeep’. Many of their evaluations of each of these proposals for each category would be found incongruent with much of the recent research and urban theorizing we’ve discussed, and perhaps that is why the potentially less successful proposal was chosen over the other. In Fig. 39, we see that

restaurant-goers are privy to the action along the thoroughfare, but removed and protected from it. When one is sitting and eating, an environment that offers prospect & refuge is preferable to and environment where one is on display. Meanwhile, the passers-through can stop and sit on benches or planters lining the wavy walkway, or they can continue on. To name this proposal the 'ambulatory' proposal is appropriate: a walk along this path would be a lot more interesting and less stressful than a straight shot sandwiched between a building face and a busy terrasse. Proposal 2 offers signifcantly greater green coverage, to boot.

Intersection with Eudaimonic Principles

Synthesizing the huge amount and variety of information and links available to us in the theory described in this chapter, another systems diagram was made to explore linkages, find areas of import and overlap, and assess effects on the dimensions of eudaimonia (see Fig. 41).

The immediate reaction is, similarly to the city-scale systems diagram, that everything is connected. No one dimension, aspect or condition stands alone. A second point of note: these person-scale factors have a lot more to do with 'hedonic' affect. Having moments of haptic pleasure caused by architecture is more likely to happen at the human scale: a fun detail, a sensual material choice, or the feeling a particular room gives the occupant, for example. The complexities of a rhizomatic path system through a large park, for example, may contribute to the eudemonic dimensions, but is unlikely to have any hedonic effect. Though the end goal is eudaimonia, never experiencing hedonia would actually negatively impact our life satisfaction and, frankly, would be no fun.

The concepts that came up again and again, and seemed to oversee the majority of the other factors, were perception, social considerations, and activity. These form a triad, wherein the activity is the top: it has the ability to affect all areas of eudaimonia. Perception and social considerations feed off of each other and directly into activity: people are more likely to continue to do an activity in a space if it is social and if they perceive it as pleasant, comfortable and safe. Thankfully, architecture has the ability to strongly affect all three of these factors. How a designed space is perceived is obviously within the control of the

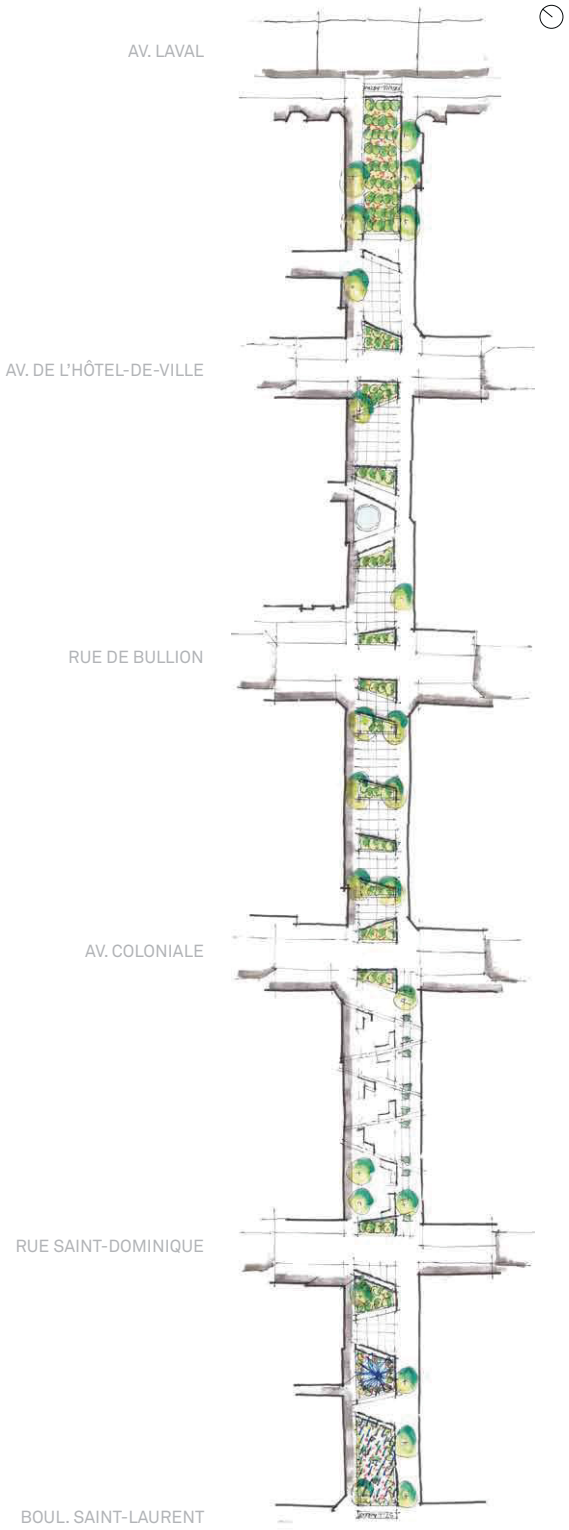
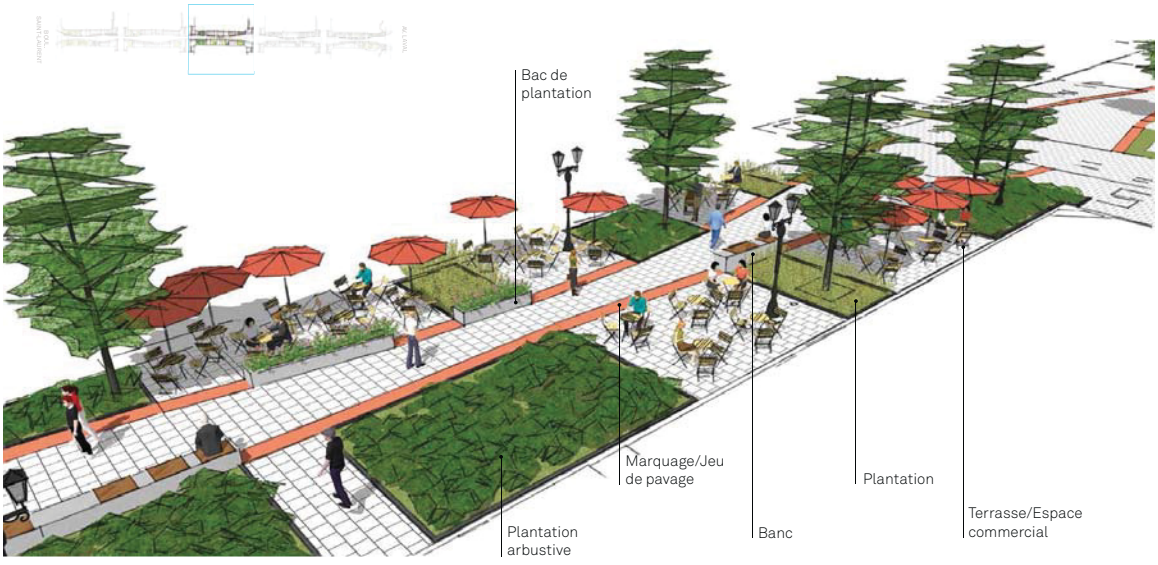


Fig. 37 AECOM proposal for Rue Prince Arthur

Fig. 38 AECOM proposal for Rue Prince Arthur



* Les arbres existants sont intégrés aux massifs de plantations et leurs remplacements se feront dans ces derniers.

Fig. 39 AECOM proposal for Rue Prince Arthur

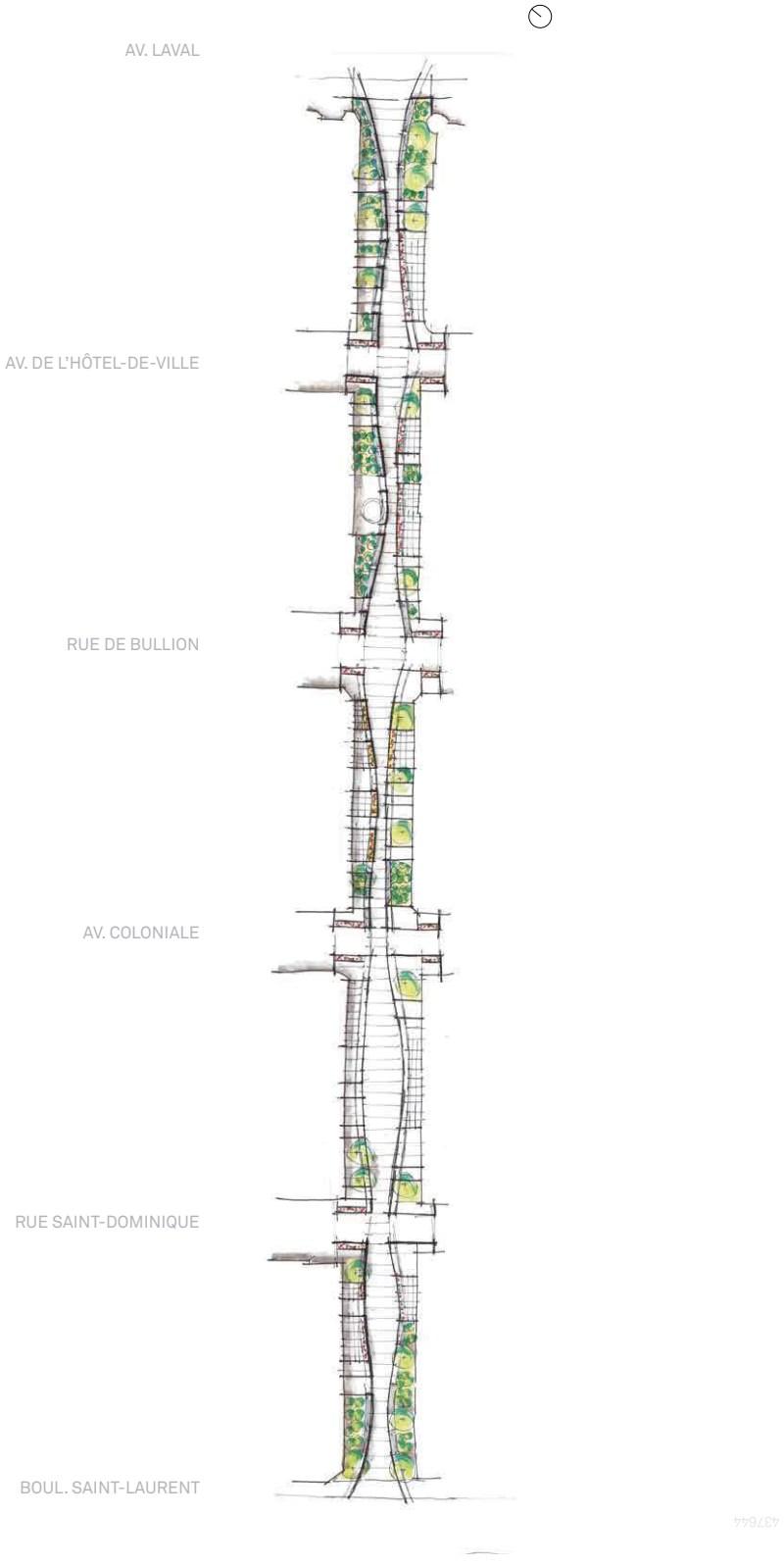


Fig. 40 AECOM proposal for Rue Prince Arthur

architect, to a huge degree (though, of course, not infallibly). The social interactions and possibilities of a designed space is also within the control of the architect. Finally, the activity that takes place within a space occurs because the architect designed the first two factors a certain way: an intended program does not exist in a space because an architect writes an activity in a box on a plan, but rather because she designs the space to imply an activity. None of these are deterministic, but strong suggestions can be made and opportunities provided.

So we've come full circle. We end on two main themes that represent the goals of eudemonic design: sociality and perception. Chapter 3 discussed sociality in a direct way, and Chapter 4 discussed perception in a direct way, but because neither of these are independent of the other, both chapters have touched on both themes. From the theory we've touched on comes a set of 5 principles as a guide for eudemonic design.

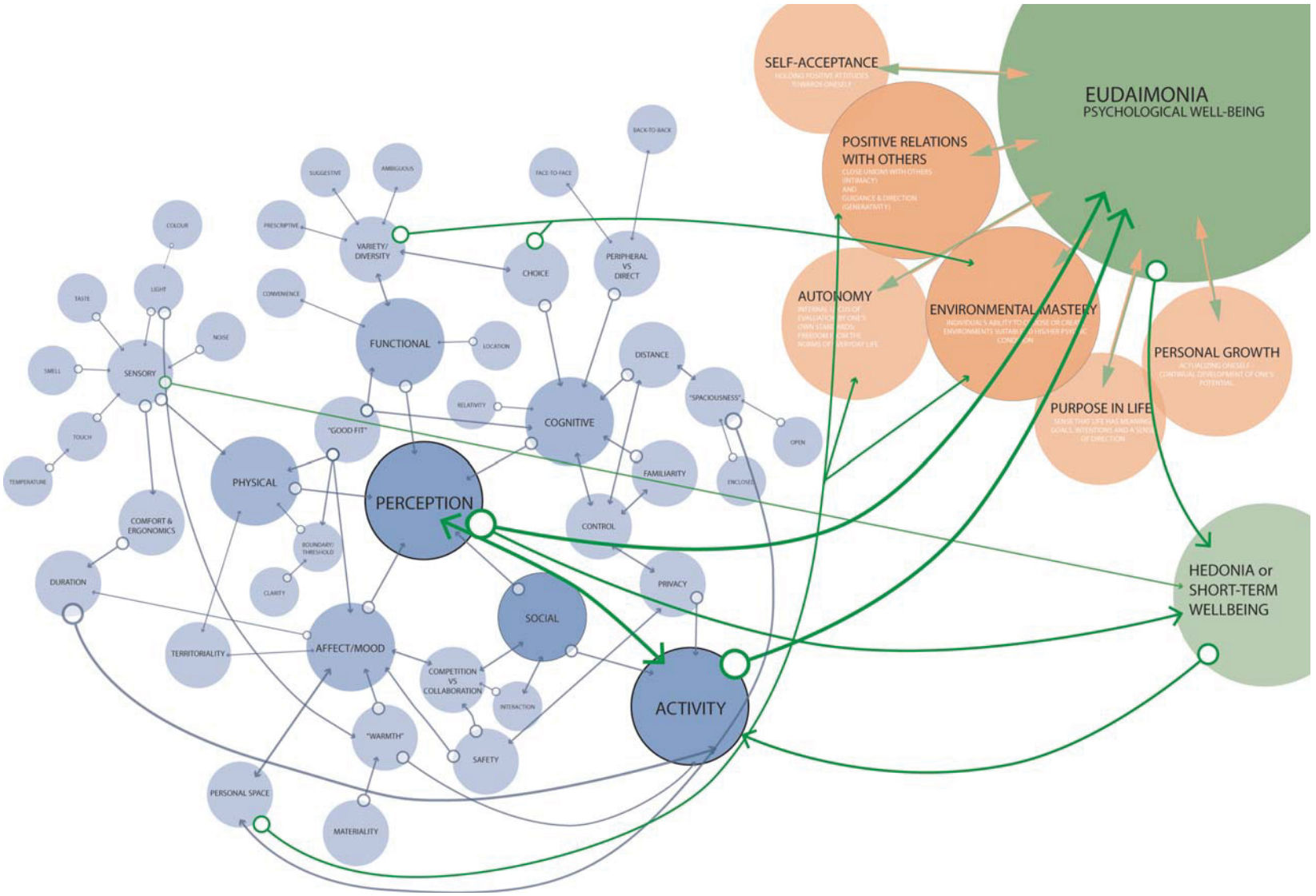


Fig. 41: Eudaimonia - phenomenological systems diagram

Chapter 5: Principles

Cognitive Framework for Eudemonic Design Principles

We've touched on the ways that a few different disciplines can inform design decisions that architects make, but how do we wield this mass of information effectively without presuming to know what's best for others or being overly prescriptive?

"Cognitive Architecture" by Ann Sussman and Justin B. Hollander is organized into six chapters, each representing a theme in neuroscience research that can be explicitly applied to architecture. Cognition is a term used to describe the processes of the brain that perceive the world, categorize it, processes it, make associations, and even the processes that affect emotion and behaviour. Cognition is the language through which our brain reads the world and speaks to us about it. If we hope to design an architecture that speaks to how we think and feel, that speaks to the dimensions of eudaimonia, the surest and most effective path is through the language of a cognitive architecture.

Earlier, I discussed the differences in the left and right hemispheres of the brain, in analagy to the values of different fields of knowledge as they relate to architecture. I would like to reiterate a point about framework and content: the framework should be structurally sound, but the content can be variable, evolving, and even artistic. Using a cognitive framework (i.e. adapting the language that translates the world to the brain) is the contingency that ensures that our 'design instincts' are effectively implemented to promote healthy and happy spaces.

The cognitive themes described by Sussman and Hollander have been adapted into broader terms that better encompass the breadth of other equally valuable research. Almost as if to validate the cognitive framework, it was extremely easy to categorize the other literature within the five principles. Areas of overlap and common narratives amongst architectural theorists are distilled to describe simple but nonprescriptive rules by which to implement each principle. In a sense, the rules are not so much 'rules' as 'things to consider and implement' when making design decisions.

The Principles

1. Edge Conditions

Boundaries and thresholds are to be soft.

Simple rule of thumb: hard and jagged = bad, soft and round = good. What does this mean spatially?

We've already touched on the finding that people prefer curved forms and curved spaces to sharp, angular ones, but let's add to that. The brain is constantly scanning for edges, defining forms and spaces out of complex boundary conditions. The way we design these edge conditions can facilitate this process, and create feelings of safety and pleasure.

Because our brains are complex and intelligent, we can imply softness and roundness without literally designing everything in a curve. Material choice can evoke feelings of hardness or softeness. Layering thresholds can blur an edge condition. In fact, celebrating and lavishing in the threshold in general is a great move.

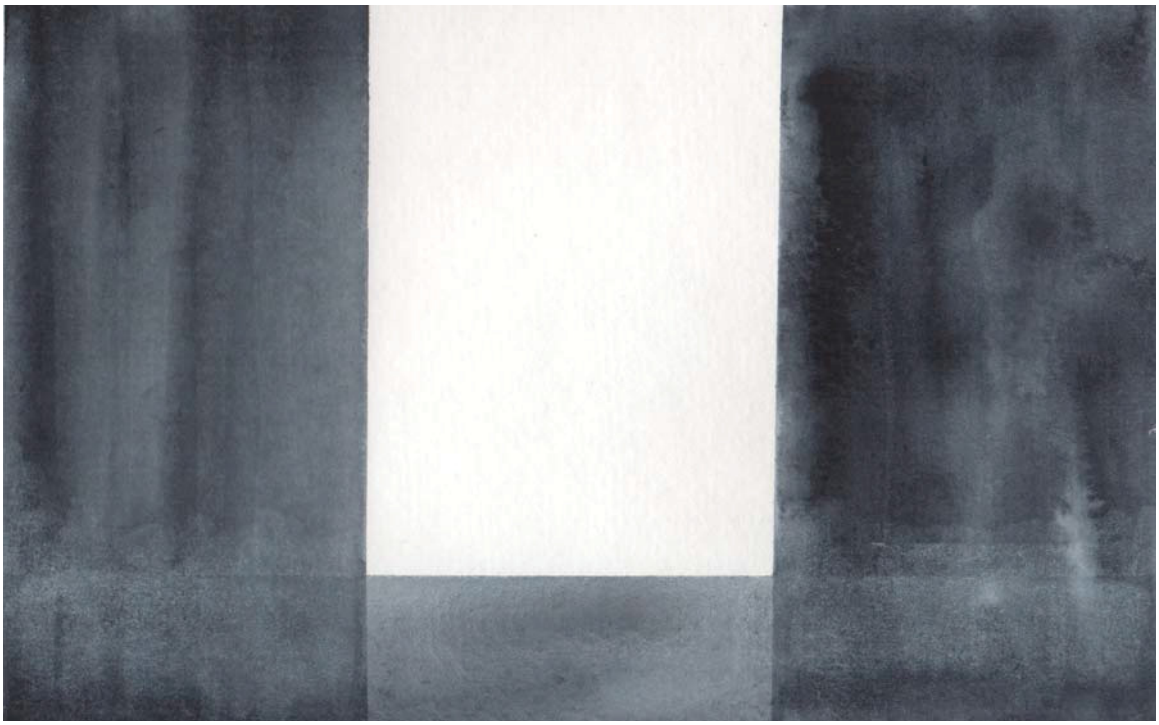


Fig. 42: Hard Edge

Fig. 43 Soft Edge

What is a hard edge and what is a soft edge? A hard edge (see Fig. 42) is abrupt, solid, and lacking in sensorial interest. It can also be a clear edge between a safe place and a dangerous one. Blank brick or concrete walls, as well as that edge perceived between a sidewalk and a high-traffic street can be thought of as hard edges.

Meanwhile, a soft edge (see Fig. 43) lavishes in the threshold condition. It is diaphanous, permeable, and inviting despite being a clear edge condition. Buffer zones, arcades, and front porches can be thought of as soft edges.

What's so important about the edge condition? Thigmotaxis is a term in biology for living creatures' preference for following an edge rather than venturing out into open space. People are no exception to this phenomenon. Because of thigmotaxis, people tend to gather and spend more time in spaces with soft edges (compare Fig. 44 to Fig. 45). They will also ultimately be more likely to traverse the open space if they have a specific destination in view. In short, soft edges activates a space.

Fig. 44 Thigmotaxis of hard edges

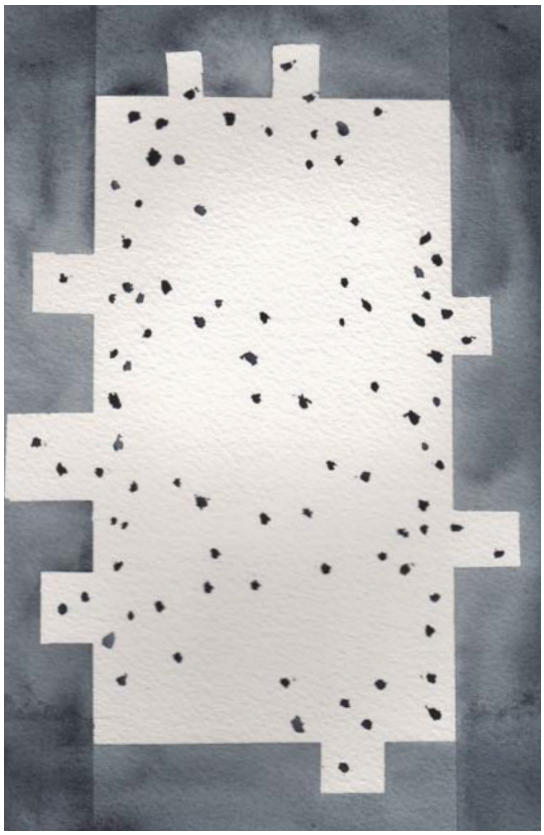


Fig. 45 Thigmotaxis of soft edges

2. Social Relationships

Spaces promote gathering and social interaction at varying degrees.

It can be argued (and it often is) that all architectural spaces should be social. Often we discuss private/public relationships, or innovate office space design to negotiate more social coworker relationships. Some insist that cities do not have enough privacy, while others insist that the city does nothing but alienate and make anonymous its inhabitants.

The fact of the matter is that social relationships, from the person whose name you don't know but you see them three times a week on the bus on the way to work to your closest friends and family, are the root of human happiness. I am not being hyperbolic. Social relationships are the single most important dimension of psychological well-being. Each of us varies in the qualities we look for in our social relationships, those ones that make us thrive best and that harm us least, and this can be individual. But public life is central to the human existence, and the way we design public spaces should therefore

be cognisant of the social opportunities those spaces present. A matrix of examples of different degrees and sizes of social interactions are shown in Fig. 46. Be mindful that as important as hearth-type spatial archetypes are for gathering, individual people-watching opportunities are important as well. Sociality doesn't depend simply on bringing people together, but also providing opportunity for them to do so on their own terms.

There are thousands of useful tools for architects hoping to design socially. Here I name a few useful things to keep in mind that might not be known offhand or that I believe are of particular importance.

Perceived safety (or perceived danger) can greatly affect our attitude towards others, as well as our sense of community. The perceived safety of a built environment can even affect how much we trust other people. The design of spaces that feel safe can include spatial concepts like prospect and refuge, or can be as simple as ensuring circulation is well-lit. Perceived safety also intersects with other principles, as navigable and easily understood (by the brain) spaces put us at ease where confusing spaces that cue danger reactions in the brain cause anxiety and mistrust.

As well as the appropriate physical conditions for an interaction, activity itself plays a large role in the sociability of a space. If possible, program choices should be public and collaborative. The space designed to house a public program should be inviting, not hidden away or programmatically blocked off from public space.

There exist certain distances at which people can comfortably interact at different levels of intimacy, depending on field of vision and the details required to interpret and communicate complex emotion. These are shown below in Fig. 47. These distances are contextually applied at the discretion of the architect: for example, in the design investigation of these principles I have made it rule of thumb that walkways and paths should be at least 3 metres, and no more than 5 metres wide. This ensures that walkways feel safe - you can always tell whether an oncoming stranger is friendly - as well as providing opportunity for recognition of an acquantaince or friend *and* making sure there is enough room for others to pass should a conversation strike up. One of the successes of eudemonic design that I will elaborate on in the conclusion is that the benefits tend to snowball.

group size	degree of interaction					
	none	passive	passing	light	collaborative (w/ a goal)	meaningful
single (alone)	sleep	mindless daydreaming; watching TV; reading	sensing neighbours or passersby	phone call; skype; social media	solitary work; study; self-care	meditation; prayer; deep reflective thought
single (in a crowd)	"alone in a crowd"; waiting alone at transit terminal	people-watching; doing a public activity alone	interaction with a stranger e.g. cashier	running into a neighbour, friend, or acquaintance	solitary work, study or self-care in a public venue	performance; speech; art (as the performer)
small group (2-4 people)	public restrooms	waiting at the bus stop; lines; elevators	sharing a table with another group	going for a coffee with a couple of friends	shared garden upkeep; dog walking with a friend	meaningful time spent with close friends/family
medium group (<20 people)	public change rooms; doctor's office waiting room	coffee shops; busses or trains in transit	spontaneous gathering (e.g. street performer, fender bender)	social venues (e.g. bars, nightclubs); larger social gatherings	lectures and classes; group gym classes; volunteer groups	special occasion gatherings (e.g. holiday, wedding, memorial)
large group (public)	congested sidewalks on main streets; busy grocery store	markets; malls; regular streets; lobbies	busy public spaces; public parks	movie theatres; local sports; public spaces "after hours"	public protests; political processes	public celebrations (e.g. parades); events (as the crowd)

Fig. 46: Varieties of social group size and degrees of interaction

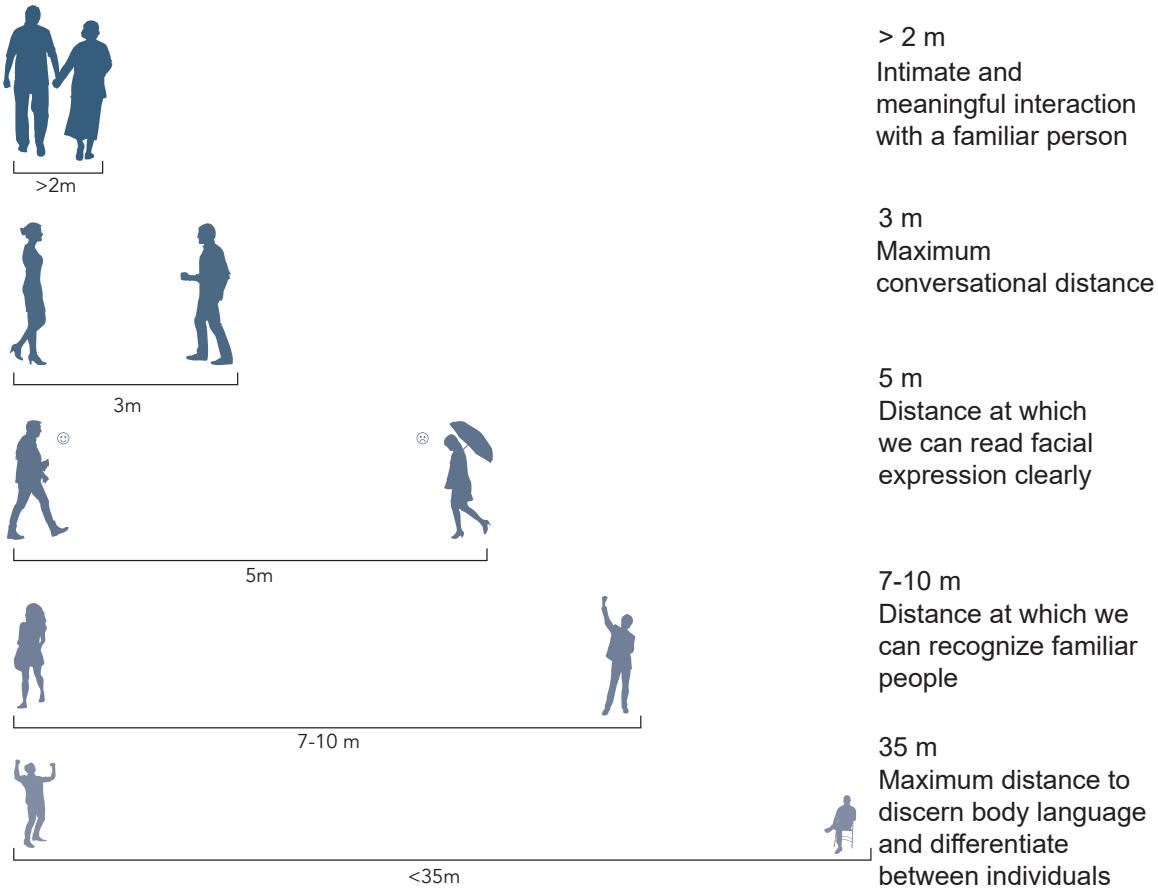


Fig. 47 Social distances

3. Spatial Relationships

Design must promote the perceiving, understanding, and navigation of space.

The consideration of spatial relationships is bread and butter to architectural design. In eudemonic design, we pay special attention to spatial forms that contribute to the perception of the space that might impact the efficacy of other principles, spatial forms that promote wayfinding, and spatial forms that are pleasing to the brain or easily understood by it. By focusing on these types of spatial relationships, we impact any of the dimensions of eudemonic well-being, but in particular environmental mastery: we want people to understand the space they're in, the implications of the space, and feel they are in control of how they will navigate it and use it. The following are some themes repeated throughout the literature.

order without complexity | order AND complexity | complexity without order

Fig. 47 Order and complexity

Patterns & Rythm:

The brain is really good at finding patterns and rhythms in just about anything. The language of eudemonic design provides both for the brain to observe and make decisions by. When a person notices, for example, a change in the spacing of columns, they may perceive the change as marking a threshold to a new space, room, what have you. Patterns and rhythms help us categorize things, and can even indicate meaning or narrative. Patterns, in particular, can also be used to reinforce biophilic effects. Rhythms pertaining to certain social distances might indicate or promote a certain type of social interaction. In other words, patterns and rhythms are a morphological tool by which to translate techtonic architectural form to otehr eudemonic design principles. They also contribute to feelings of liking a place and perceptions of beauty.

Complexity & Order:

The brain wants what it wants, and what it wants is both complexity AND order. Order without complexity is boring and lifeless; complexity without order is overwhelming and chaotic. Like most things, there is a Goldilocks-esque balance of ‘just right’, where order and complexity balance. Consider music, which is an ordered complexity of sound, and which people find to be pleasant, stimulating, and meaningful. Noise, on the other hand, is chaotic complexity of sound, and people find noise to be unpleasant and stressful.

Spatial Hierarchies & Fractals:

We are attracted to hierarchies and easily understand their implied order. Hierarchies are abundant in natural forms and processes, and so spatial hierarchies are considered a biophillic design trait. We intuit a lot from spaces designed with clear hierarchies; as architecture has so often been likened to the human body, so we tend to easily place ourselves within it when designed with hierarchies in mind. Fractals are another sweet spot at the intersection of several eudemonic design principles. Being both hierarchic and a pattern, ordered and complex, fractal forms embody many of the spatial relationships that we're wired to enjoy most.

Bilateral Symmetry & Intentional Asymmetry:

We've heard before about symmetry and beauty, about how symmetrical faces are a good indication of beauty. This applies somewhat to architecture as well. Symmetrical spaces and buildings are easily anthropomorphised (we tend to feel more attached to buildings that subconsciously remind us of faces) and easier to understand and navigate, but that doesn't mean that every built form should be entirely perfectly symmetrical. As with all the design tools presented here, symmetry is a tool that can be used to elicit certain

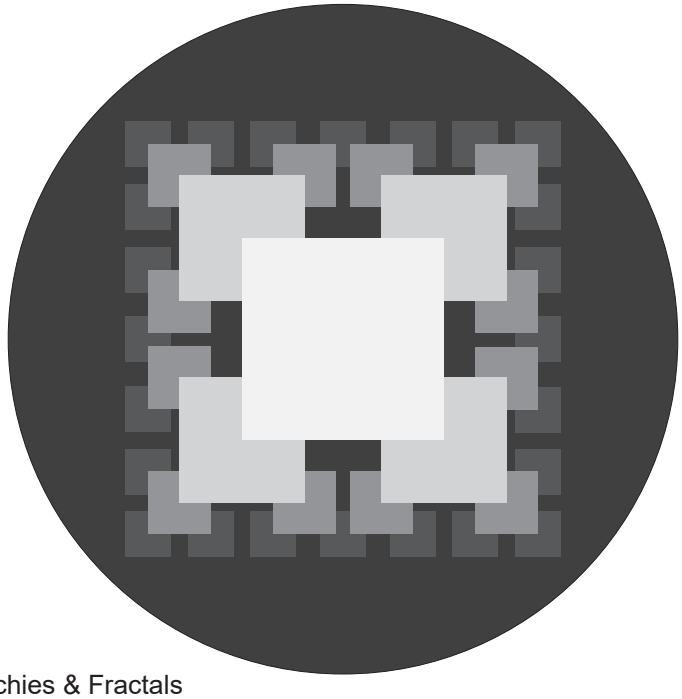


Fig. 48 Spatial Hierarchies & Fractals

feelings or understandings about space. For example, if you had a large site on which to place several buildings, you might include symmetry in two ways: have the whole site read symmetrically, or place the buildings by some other strategy and have their individual plans read symmetrically. In the first case, the whole site would read as a body, and in the second case, each building would be its own identity, part of a grouping. For a university campus, the first strategy might be more desireable, to embody a narrative of cohesive institutionalization. For the design of a halfway-house community or low-support older adult housing, the second strategy might be more desireable, so that each occupant might feel that their hope is independently theirs but part of a community grouping. Symmetry is both a source of beauty and a communicative spatial tool.

Fig. 49 Bilateral Symmetry
TheNose, *Salk Institute Courtyard.* 2007, digital photograph. Available from WikiCommons, https://commons.wikimedia.org/wiki/File:Salk_Institute.jpg

4. Meaning, Narrative, and Place

Spaces foster place, community, and a positive narrative.

> Narrative is the unusual ability of the mind to create stories and, in the process, find multiple ways of linking to the environment and securing a place in it.[43]

The brain seeks out narrative. Where no narrative exists, we tend to write one based on our own experiences and prejudices. Social, historical, and cultural contexts

43 Sussman and Hollander, *Cognitive Architecture*, 133.

ARE important. They contribute to a sense of identity, a sense of community, and can affect those dimensions of eudaimonia less obviously impacted by architectural design.

A narrative told by architecture can be as grand as an historical monument, or as haptic as a carefully considered procession. Thinking about meaning, narrative and place is less about rules of dimension or form and more case-by-case, and is the starting place of any design project. What has been commissioned? Who is asking for it? Why? What do they need? Why do they need it? These basic project questions are all geared towards creating a narrative, more than they are about pragmatism; to the brain, pragmatism is creating solutions that have relationship to a narrative. In other words, we find meaning in narrative, and narrative in place.

Place helps to create Narrative. Shared Narrative helps to create Community. Public spaces - and the narratives they create - are fundamental to community identity and meaning. I can, without hyperbole, say that public space has the potential to liberate and empower, as much as it has the potential to oppress. Similarly, the narrative of a place has the power to completely change its meaning and use.

5. Biophilia

Design must reinforce our evolving relationships with natural processes and materials.

People are biophilic: bio-, meaning ‘related to life’, and -philic, meaning having affinity or great love for. We are obsessed with life, and not just our own: we love trees, we love bees, and the feeling of the breeze... our brains are always singing an ode to natural processes and materials.

There is a whole architectural movement towards biophilic design, and it shares a few similarities with eudemonic design. It’s long been held that there is a link between the natural environment and physical health (‘putting colour in one’s cheeks’ by taking a walk outside, for example, or the concept of the European sanitorium as a health retreat in a remote setting). We aren’t surprised when an office worker with a windowless work space complains of Seasonal Affective Disorder, and we tend to love plant-filled offices with large windows. Parametric design trends are often informed by natural processes and algorithms.

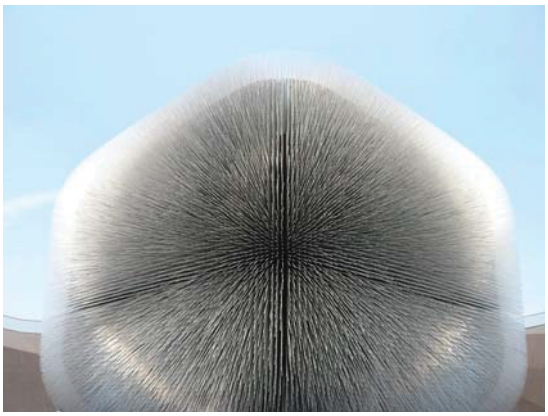


Fig. 50 Seed Cathedral in Shanghai, China designed by Heatherwick Studio
Photo by Carston Ullrich via WikiCommons at https://commons.wikimedia.org/wiki/File:A_picture_from_China_every_day_241.jpg

For eudemonic design, incorporating biophillic ideals can be subtle or it can be show-stopping à la Seed Cathedral (see Fig. 50). Biophillic ideals can be incorporated at detail scale, at human scale, at building scale, and at site scale. It can be the incorporation of plenty of planting, it can be the style in which the architect landscapes a tricky site, it can be in the choice of cladding or structural materical, and it can be, like the Seed Cathedral, a grander simulacrum.

I think it is important with this principle more than the others to reiterate the freedoms within; one can still design in any style and have it be biophillic. Frank Lloyd Wright's work is inherently biophillic, as he had a fondness for natural material and, of course, cared deeply about the placement and form of his houses within their individual landscapes. Framed views, processional interiors, and careful landscaping all contribute to the biophillic nature of his work.

Even simpler in form, we can also look to Mies Van der Rohe's Farnsworth House for biophilic qualities. His material and formal choices aren't particularly biophilic, but the narrative of the famed house in relation to its natural surroundings certainly are: the occupant's privacy isn't protected by the house's envelope, but rather by the forest which surrounds it, of which the view is carefully framed.

SHoP's Dunescape, a MoMa PS1 installation, is yet another completely different style of architectural form that also exhibits biophillic qualities. The wooden slat rhythms

and patterns are given complexity and natural form by mimicking the shape of a wave about to crash on a beach. Water features, careful shading, and mimicking of those natural forms that people like to sit and lay on at the beach made this installation extremely successful during its summer life.

The implementation of biophilic ideals as part of eudemonic design is, as you can see, quite forgiving. Research has shown that even images of nature are correlated with positive benefits, where the real thing is unavailable, and though we'd never want to settle, this indicates that even a topical attempt at injecting some biophilia into a design is beneficial. That being said, biophilia isn't a standalone principle in this proposed eudemonic design, and it should be remembered that often the design solution that respects the other principles can be most effectively implemented in a biophilic way.

Fig. 52 Farnsworth House by Mies Van der Rohe
Photo by Victor Grigas. Available at https://commons.wikimedia.org/wiki/File:Farnsworth_House_by_Mies_Van_Der_Rohe_-_interior.jpg

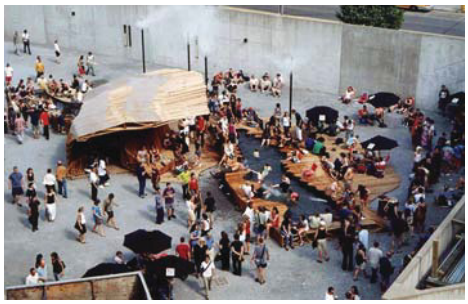


Fig. 53 Dunescape for MoMA Ps1 2000 by SHoP Architects
Images by SHoP from http://www.shoparc.com/projects/dunescape-at-moma-ps1/

Intended Attitude and Contexts for Implementation

The intended attitude towards the implementation of these principles is, as has been touched upon, not to be prescriptive or creatively limiting. The principles are useful structures for where to spend time and energy during the design process, if one wants to design to promote eudaimonia. The successes and limitations of the principles will be elaborated upon in the Conclusion, and details of their implementation in a design test will be the focus of Chapter 6.

The intended context for implementation of these principles is in the design of public space in particular. While I'm sure it is possible to design eudaimonically for private dwellings, it seemed from the research that the greatest impact of the built environment on both collective and individual eudaimonia was through urban public space, particularly when addressing the original problem of the Urban-Rural Happiness Gradient.

Chapter 6: Design

Testing: Public Space at Different Scales

Testing and finessing the Principles through design requires a fairly robust design project scope. Because it is often the access, quality, and repetition of the built environment that truly plays a role in our mental well-being, I wanted to be sure to test small scale, large scale, and the in-between of public space. Therefore I decided to pick 3 sites along a five-minute walk somewhere in the city that would offer a variety of opportunities and challenges such that I could use the principles to make design decisions.

There will be a small scale, medium scale, and large scale site, which refers not necessarily to site area but rather to the intensity of architectural intervention. The small scale intervention considers implications of the principles in the context of 'in-between' space in the city; taking over a parking lot, a laneway, or transit terminal, for example. The medium scale intervention is a landscape and/or small-scale building intervention; somewhere between the intensity of 'street furniture' and full-blown public building. A public park design with associated ameneties, for example, could be a medium scale intervention, or a single cafe with a terrasse space opening out to the street. A large scale intervention would be a true public building intended for larger occupancies. Event space, community centers, sporting centers, a theatre, a library, etc. would all be large scale interventions.

Fig. 54 Photograph: Seven Bays signage framing the community services across the street.

Fig. 55 Locating the urban site and the three ‘sub-sites’

The implications of the principles to the design process will be evaluated in this chapter. The implications of the principles to the design result will be evaluated in Chapter 7 as part of the conclusion.

Gottingen St. in Halifax, NS: Site, Place, Community

Gottingen St in Halifax, NS offers a rich variety of program types, lot sizes, social stratification, and narratives, which makes it a valuable context in which to test the applications of the principles. Considering the role of everyday spaces in one's well-being, and concepts proven to contribute to well-being such as walkable neighbourhoods, I've chosen a stretch of Gottingen St that represents a 5-10 minute walk to look for potential sites. This stretch of Gottingen is capped at one end by the Commons, and at the other end by North St, where the zoning becomes homogenously residential. Both 'ends' of this section are capped by traffic arteries, and Gottingen itself is quite automobile-dense along

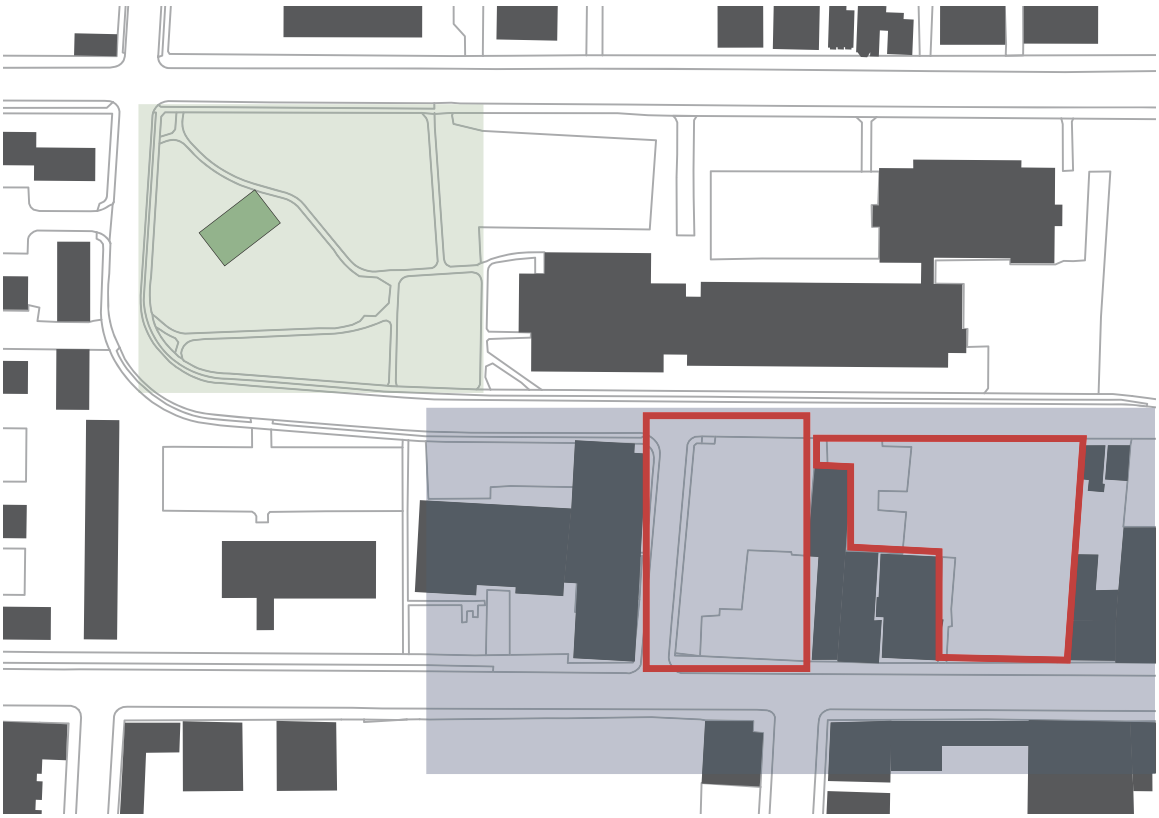


Fig. 56 Location of Hope Blooms vis a vis the Large and Medium sites

this stretch, particularly during traditional rush hours. Figure 55 shows this stretch with a transparent blue rectangle. Within this stretch, the three sites - Small, Medium, and Large - for closer inspection are located.

This stretch of Gottingen represents a large variety of program types and lot sizes: commercial use and residential use, but also community services, night life, restaurants, etc. What it's missing is accessible, free-for-use and inviting public space. When one walks along this stretch, the only repose from the oppressive presence of the traffic-heavy street is to enter a private business. This makes this part of Gottingen a great place to insert public architecture for the better of the community.

Gottingen Street is a historically low-income area of the city, but its larger neighbourhood (North End Halifax) is currently gentrifying. Throwing in the density of community and social services along this stretch, what we see is a bourgeois rock climbing gym/cafe/bar immediately across the street from the Salvation Army homeless shelter (as a visual example - see Figure 54). When social stigma, income imbalance, and prejudicial institutionalism are so visibly present, embodied in the architecture of the street, the need for eudemonic (read: accessible and empowering) public space becomes ever more obvious.

Some of the narrative of the neighbourhood has presented itself already, but while the neighbourhood has struggled, it has also persevered and developed a strong sense of community, culture, and identity. One of these narratives is the aforementioned gentrification juxtaposed with systemic imbalances; the other is the Hope Blooms organization, which empowers youth to participate in activities and environments that contribute to social determinants of health. Part youth group, part community garden, and part business (the plants and herbs grown in the garden are used in the making of salad dressings, which can be purchased online from the group), the narrative of the Hope Blooms mission statement is exactly in line with the design of eudemonic public space. Further, the existing greenhouse and garden space for the organization is extremely close to the chosen sites for intervention (see Figure 56). An overarching narrative between all 3 sites therefore incorporates both of these themes, largely through program choice and circulation strategies.

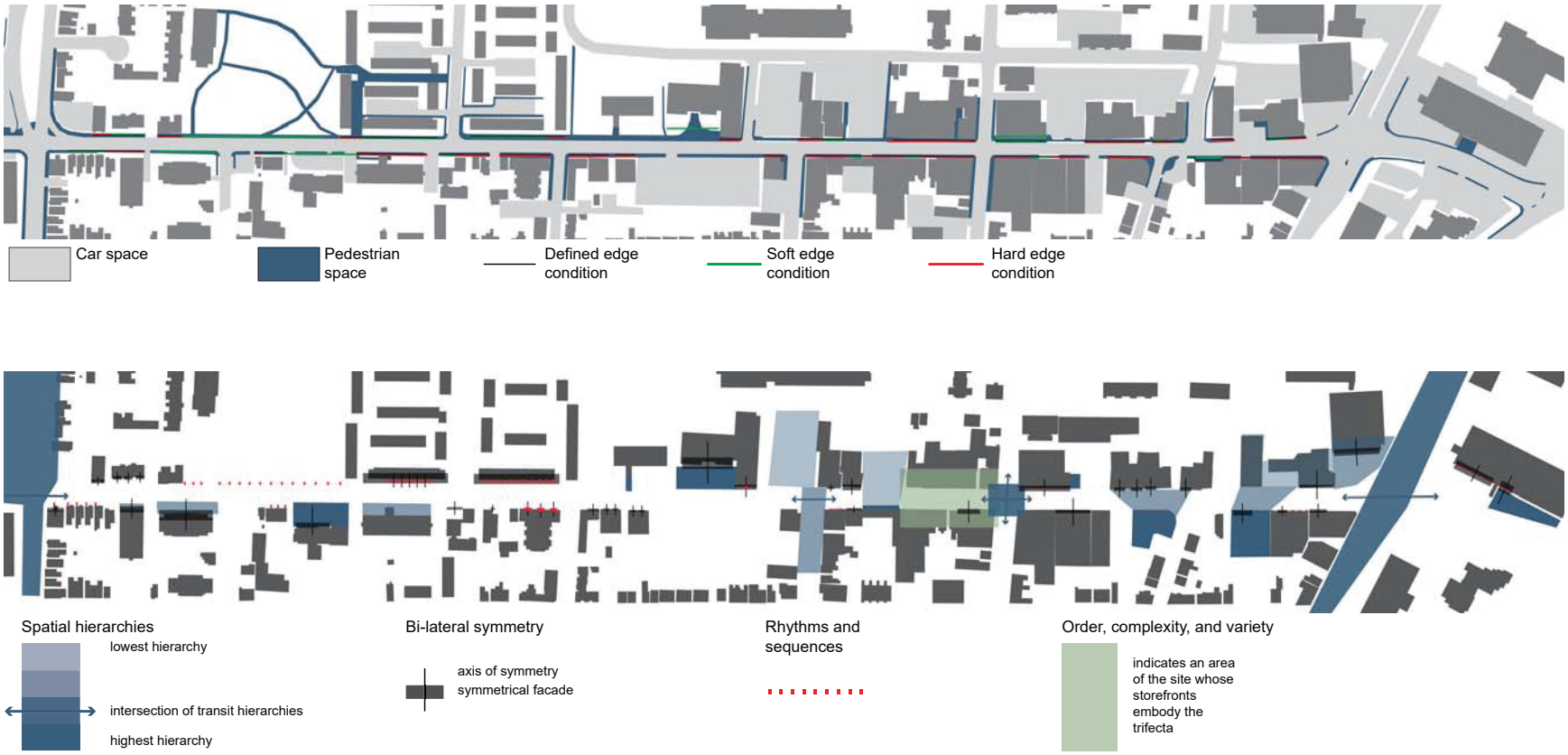


Fig. 57 Morphology mapping the Eudaimonia of Gottingen St.

Using some of the more morphological aspects of the Principles, this portion of Gottigen underwent a mapping exercise to determine two things: firstly, if the principles could be used analytically with existing archtiectural conditions, and secondly, to determine if and where there were clear areas for improvement. In Figure 57, these maps show several issues that will be addressed in design.

One of these issues is the ratio of the area designated for car use vs. the area for pedestrian use. The amount of grey compared to blue is a bit overwhelming - therefore the design test will seek to reduce the car space and increase pedestrian space. Another issue is the quality of the edge conditions: most of the edge conditions are boundaries immediately adjacent to the relatively narrow sidewalk, and excepting a few softer areas noted with green lines, the edge conditions are at best nondescript and over all fairly hard. Walking down this street definitely feels a bit like being shuffled through a pedestrian tunnel the width of the sidewalk. The design test will seek to invite pedestrians off the sidewalk for a break from this condition, and soften the journey for them.

There are good amounts of rhythm and symmetry sprinkled throughout the street, so those positive conditions will be reflected in the design test. What is evident, however, is that the South-West side of the street (the bottom side in the maps) is sort of looming over the North-East side of the street - there are several areas where the openness and desert-like qualities of parking lots are only exacerbated by looming, several-storey buildings across the street, casting shade and generally feeling quite ominous and oppressive. These parking lots, combined with the other needs we've discussed, become perfect opportunities for intervention. Figure 59 shows them in their 'before' state.

The three sites, then, are as follows:

Small - the parking lot for Seven Bays Bouldering is to be taken over for a public plaza.

Medium - A parking lot with an infill condition and sloping hill will be transformed into a public community garden space, featuring a dog park, meandering barrier-free circulation, and a greenhouse structure. This site will be closely connected to the existing Hope Blooms greenhouse.

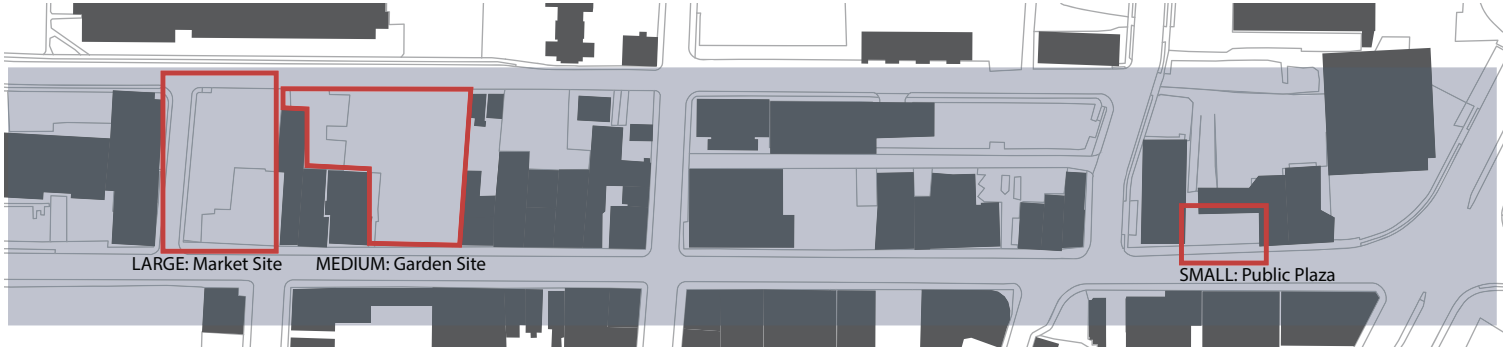


Fig. 58 Locating the three sites

Fig. 59 The ‘Before’ picture of the three parking lots to be usurped

Large - A corner parking lot, completely paved and connecting in the rear to the Medium site parking lot, will be transformed into a market building and more civic public plaza. This site is also closely connected to the Hope Blooms greenhouse, and as a fairly visible corner lot, acts as a landmark for the three public spaces along the street.

Design Overview

Overview

The 3 sites have been situated. The overall theme of the amalgamated interventions is the empowerment of the North end community - whether this is the democratization of a privatized space to dull the effects from gentrification, to providing new public and program-specific space for an existing community organization, to designing an informal market and event space to celebrate grassroots movements, business, and festivals, the overarching theme of the interventions speak about and are a response to the narrative of the neighbourhood. A large map showing the new interventions situated along Gottingen St is shown in Figure 60.

All three sites have returned parking space to the ownership of pedestrians. Each is linked through narrative - rejecting gentrification for true public space and the narrative of food production and distribution through community organizations like Hope Blooms - and through architectural language. All three sites invite pedestrians away from the busy sidewalk for mental and physical repose, and invite a wide range of social conditions from casual occupation while waiting for a bus or simply ‘passing through’ the site to more meaningful interactions like workshops, shows, protests, or collective activity. All three sites are intended to be open for use 24 hours a day, 7 days a week. All three sites are to be kept maintained and open throughout all seasons.

Fig. 60 Complete overview of all three sites

Small Intervention

The small intervention consists of the reclamation of a parking lot in front of a bouldering gym/cafe restaurant called Seven Bays, and an overview of the site is shown in Figure 61. At the mouth of the south end of Gottingen St, the small site acts as a sort of gatekeeper for the overarching site. Of the three subsites, this site has a particularly politically poignant condition: across the street from the trendy cafe/gym hybrid are several community services, most notably the Salvation Army shelter. There is also a bus stop in front of Seven Bays. Converting the parking lot into a plaza celebrates the moments of waiting for public transit and speaks to rejecting the automotive dominance of Gottingen Street.

The site consists of a wood-decked area and a stone paved area. Trees and streetlights define a small plaza, which features a hexagonal snake-like bench. Acting as focii for the curves in the bench are larger streetlights that house the routers that provide free public wifi and charging stations. Moving towards the stone pavers, a free public universal washroom pushes back at the sign near the entrance to the cafe that says, “Washrooms for customers only”. On the outisde of the washroom structure, a small canopy shades a drinking water sink.

Finally, the stone pavers delineate the area that would allow vehicular access to municipal dumpsters. I envision the wall of the neighbouring building, which currently is painted with a mural, being utilized as a legal, public graffiti wall.

Fig. 61 Small - Plaza - Overview Site Plan

Medium Intervention

The Medium site focuses on the idea of the Garden as an archetype and narrative, and what that narrative can contribute to the urban environment through the eudemonic lens. This site links physically (and through narrative) to the Large site adjacent. Currently, the site features a large vertical drop, a gravel parking lot, and a ‘public pathway’ that shares a similar narrative to the Commons of Halifax; owned by the public, and therefore maintained by it. In the eudemonic proposal, the concept of ‘passing through’ this site merges with the garden archetype in an ambulatory landscape design that doubles as a community garden.

At the top of the site, a casual terrasse shaded by trees serves a small existing restaurant and the public. The grade change from Gottingen St to the far side of the site approaches 6 metres, which is significant. An ambulatory combination of ramps and stairs shapes the landscaping of the site, bringing people down as quickly or slowly as they please, depending on the route they take. Besides the use of stairs, the ramps are designed to be comfortable and safe for use by those with physical disabilities. Interstitial parcels of landscape carved out by the procession become planters for a community garden. Water and compost stations service that program. At the bottom of the processional garden, a greenhouse structure houses the administrative and greenhouse functions of the community garden, while framing and bounding the site. Tucked into the shadowy corner of the site is a fenced dog park. A lighting strategy helps make the space feel safe throughout the night, and the fixtures themselves act as wayfinders.

This site merges activity, social interaction, and lavishes in the interstitial, overlapping and amplifying its implementation of the eudemonic principles in ways that will be illustrated shortly.

Fig. 62 Medium - Garden - Overview Site Plan

Large Intervention

The Large site features a building whose primary purpose is a market space, but that can also be used by the community for festivals and events that frequently take place along Gottingen Street. This site deals with the same grade issues as the Medium site (as they are adjacent), and though this site provides a little less room to luxuriate in the descent, the grade change also offers opportunities for promoting activity and socialization. The market, though not the only potential use of the building, is tied to the program of its neighbouring site (the Garden) physically and in narrative. The Large intervention's additional layers speak to the empowerment and sense of mastery of the community it houses.

The main market structure is terraced, rhythmed and symmetrical. The space itself provides the minimum requirements for frequent and informal market activities, maintaining adaptability for other community purposes. Festivals, workshops, classes, popup galleries, and even small performances could easily be held in the structure. At nighttime, doors remain open and the interior lighting lights up the building like a welcoming lantern. The stalls become the perfect place for late night food vendors to set up shop, and nightlife can come and go from the market as an interstitial stop (a safe, night-time public space) between activities.

The ramp and stair landscaping immediately adjacent to the market shares the rhythm of the market's structural bays and terraces, effectively extending each terrace outdoors and softening the edge between market and street while also providing physical access to people with disabilities. The 'stramp' also provides opportunities for planting.

Behind the market, a take on the casual outdoor ampitheatre receives plenty of sunlight while extending the adaptability of the market structure for other uses. This space connects to the lowermost part of the Garden site.

Fig. 61 - Large - Market - Overview Site Plan

Implementation of Principles

Overview

Edge Conditions

Each site seeks to soften the hard edge we see along most of commercial Gottingen St between the road and the building faces, allowing very little space for varieties of social engagement and reducing the street to a mere artery rather than the home of public space. The proximity of the Medium and Large sites, in particular, allow for a whole chunk of the streetscape to benefit from diffusion of the street edge.

Social Relationships

Each site seeks to provide opportunities for a variety of social interactions individually. As a whole, the three sites focus on the social relationships fostered around simply existing in this world: empowering a sense of well-being in actions of every day life, be it waiting for a bus, lounging, picking up produce, walking the dog, or even using the washroom, is where the architecture of public space can have the most meaningful influence. The social relationships and activities promoted by the sites are not intended to be copy/pasted to other contexts; in an ideal timeline, community consultation would be a huge part of designing eudemonic space.

Spatial Relationships

Each site attempts to provide opportunities for socialization and multiple degrees of intimacy and scale. This is, of course, within the means of each site: the plaza, for example, is much too small to host a concert, but one could argue that using the free WiFi in the plaza to connect with the seemingly infinite social pool of the internet is a social opportunity at large scale. Each site also offers plenty of choice and opportunity for different levels of interaction. If one simply wishes to hang out in public, but not interact with anyone, there will be places to sit that are slightly removed and protected. If one wishes to host a workshop or sell their artistic wares to the public, there are spaces for that as well.

Meaning, Narrative, and Place

Each site connects to and enhances the narratives previously outlined. Each site seeks to do this in a way that is positive and inclusive, rather than in a way that frames any particular issue in a negative way. The sites are definitely in the “If you build it, they will come” camp, and rely on and encourage others to be humane and compassionate with their fellow community members. If someone is uncomfortable around another person sleeping on a bench, for example, they can sit on the same bench a few feet away and not be facing the sleeper, thereby not disturbing them or feeling obliged to interact. Public space does not belong to any one group of people, and the sites reflect that.

Biophilia

Each site attempts to feature plenty of planting and tree coverage as a minimal requirement for biophilic space planning. Each site also attempts at least one formal biophilic move, as much natural material as possible (similar materials and patterns are carried through each site, linking them with a similar architectural language), and a program component that overlaps the principles of biophilia and narrative.

Small

The small intervention best tests whether the ‘big picture’ of some of the principles can still be implemented given a small parcel to improve. This design test imagines being offered laneway parcels, parklettes, and interstitial municipal spaces for eudemonic intervention and the creation of public space. The following describes some of the ways that the principles informed design decisions to shape a public plaza.

Edge Conditions

Trees and lamp posts stud the line between the sidewalk and the plaza, and also delineate the plaza space. These are spaced 3 m apart (see also: Spatial Relationships) which is distant enough to be welcoming and diaphanous but close enough to imply a soft boundary. The Northern-most (most left on the site plan) portion of the square is intentionally edged a little more harshly, because the stone-paved area is used by collection trucks to service the dumpsters of the adjacent businesses. A harder edge puts us on

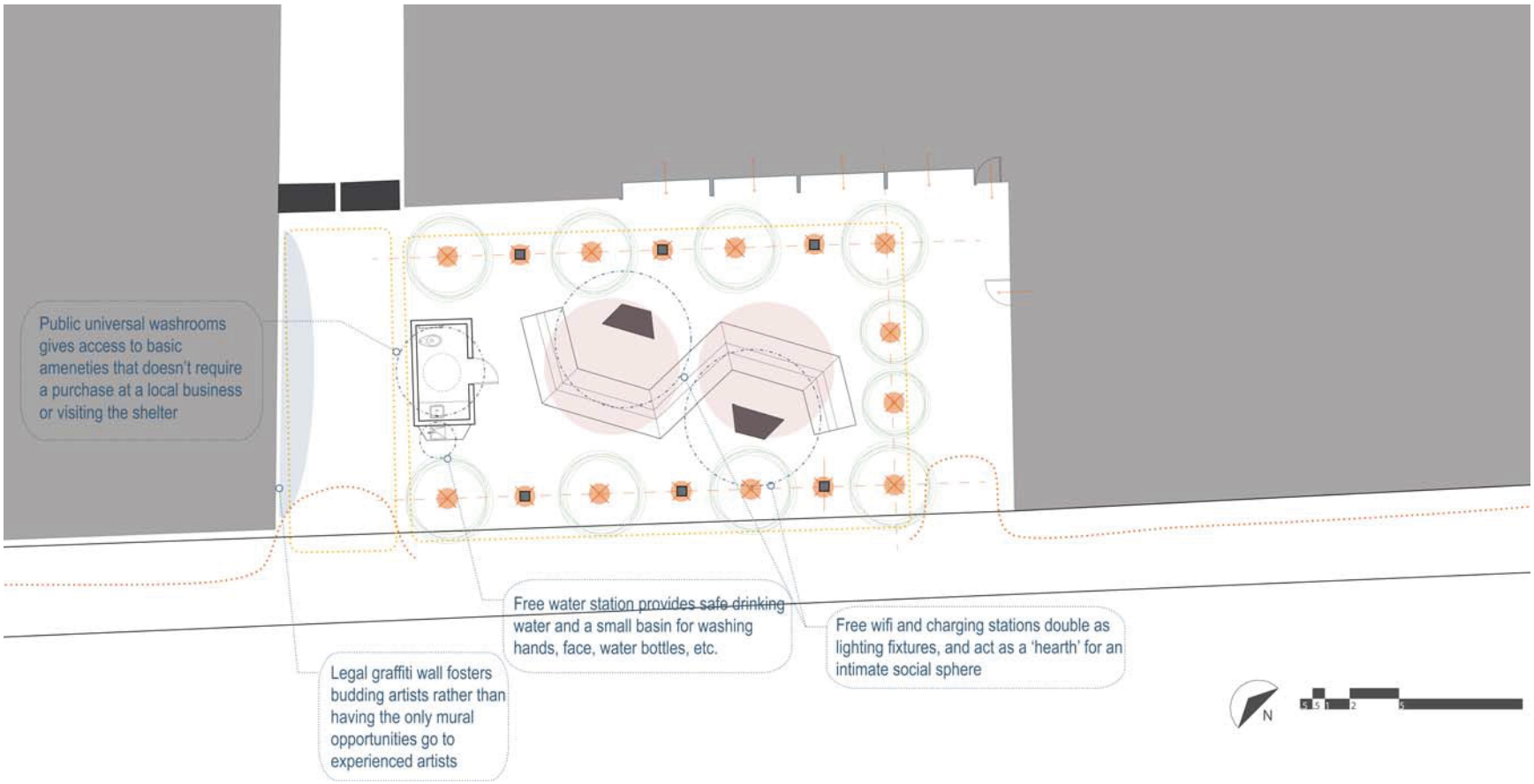


Fig. 62 - Small - Plaza - Annotated Site Plan

higher alert, as if to say, ‘this isn’t a pedestrian-only zone’. A bit of breathing room on the Southern-most edge of the plaza both allows for and welcomes the foot traffic of Seven Bays customers. The whole plaza can be thought of as a giant ‘soft edge’, an interstitial resting place with basic, public amenities that buffers between the Seven Bays building front and the street, as seen in the section (Fig. 63). This is emphasized even more in the summer, when 4 of the 7 bays of the Seven Bays gym open their garage doors during business hours. The plantings and softer materials provide a much nicer outlook for the climbers than the concrete pavement and traffic that exists there now.

Social Relationships

As an overarching theme, this site deals a lot with social equity and therefore provides free amenities for use by the public. Beyond that, the main social strategy on this site is found in the form of the bench that snakes through the plaza. By having a single bench create both convex and concave areas of seating, people can choose to sit at a point along the bench that corresponds with their social desires. For example, if you were waiting for the bus with a friend or two, and wanted to sit similar to the way people sit around a fire pit, you would sit in a convex area and all be angled towards each other. Or, if you had just bought a coffee and wanted to drink it while reading a book outdoors undisturbed, you could sit at a convex point of the bench and be angled away from other people, even if they were sitting next to you. As shown in Figure 64, the seat of the benches are marginally longer than typical, for two reasons. First, this allows for a greater variety in the ways people sit, and facilitates a more at-ease, casual occupation of the bench. Second, it does not discourage - and in fact might encourage - sleeping.

Spatial Relationships

Symmetry, rhythms and patterns, and spatial hierarchies are all architectural tools present in the plaza. The symmetry is fairly obvious. Figure 62 is a good reference for understanding the spatial relationships, as well as the section in Figure 63. As mentioned in the discussion of edge conditions, the space-framing elements (the trees and lamp posts) are spaced at 3 m and softly define an ‘outdoor room’. Three metres is the maximum distance at which conversations comfortably take place, but is also wide enough to pass by a stranger without infringing on personal space. This is an excellent example of how choices

informed by one principle often end up overlapping or benefiting the other principles; in this case, all the other principles. In the area with stone paving, used for access to the garbage disposal bins, regular pedestrian occupation is discouraged because, unfortunately, the laneway is ultimately a space for automobile use. This space is therefore left intentionally bland, especially in comparison to the warm materials, welcoming arcade-like edge, and greenery of the adjacent plaza. The spatial hierarchy is clear and pedestrians will, like moths to a flame, gather in the plaza and avoid the more dangerous laneway.

Looking at the washroom structure in Figure 65, the canopy that overhangs the water trough offers the slightest bit of shelter that offers a feeling of safety during the quite vulnerable moment of bending down to drink water. Placing the structure on the edge of the 'room' makes it seem available for use but doesn't place it in the hearth-like condition of the center, which will make people feel more comfortable about using the washroom for their private moments. We also feel safe at edges.

Meaning, Narrative, and Place

Ultimately, this site communicates clearly that basic needs can be met here. Washrooms, clean water, WiFi, and electricty for charging devices are all things that are relatively easy to provide and yet most of the homeless population struggles to access. If Seven Bays reserves its washrooms for paying customers only, then perhaps the plaza out front can accomodate the rest of the population. The form of the benches speaks to the discomfort often felt by policy makers and concerned citizens when discussing issues of homelessness; everyone wants to help, but no one wants to have to see or deal with the problem. The ' interact or don't - your choice' form of the benches means that no person has to feel excluded, but potential discomfort can be mitigated. In time, the narrative that everyone can use the benches seeps into the community psyche and hopefully reduces the instanes of discomfort. While we're discussing inclusive public space: the internet is the great equalizer. Providing free WiFi extends its inherent equalizing nature into the physical public realm.

Biophilia

The obvious biophilic elements have already been discussed: the trees, which

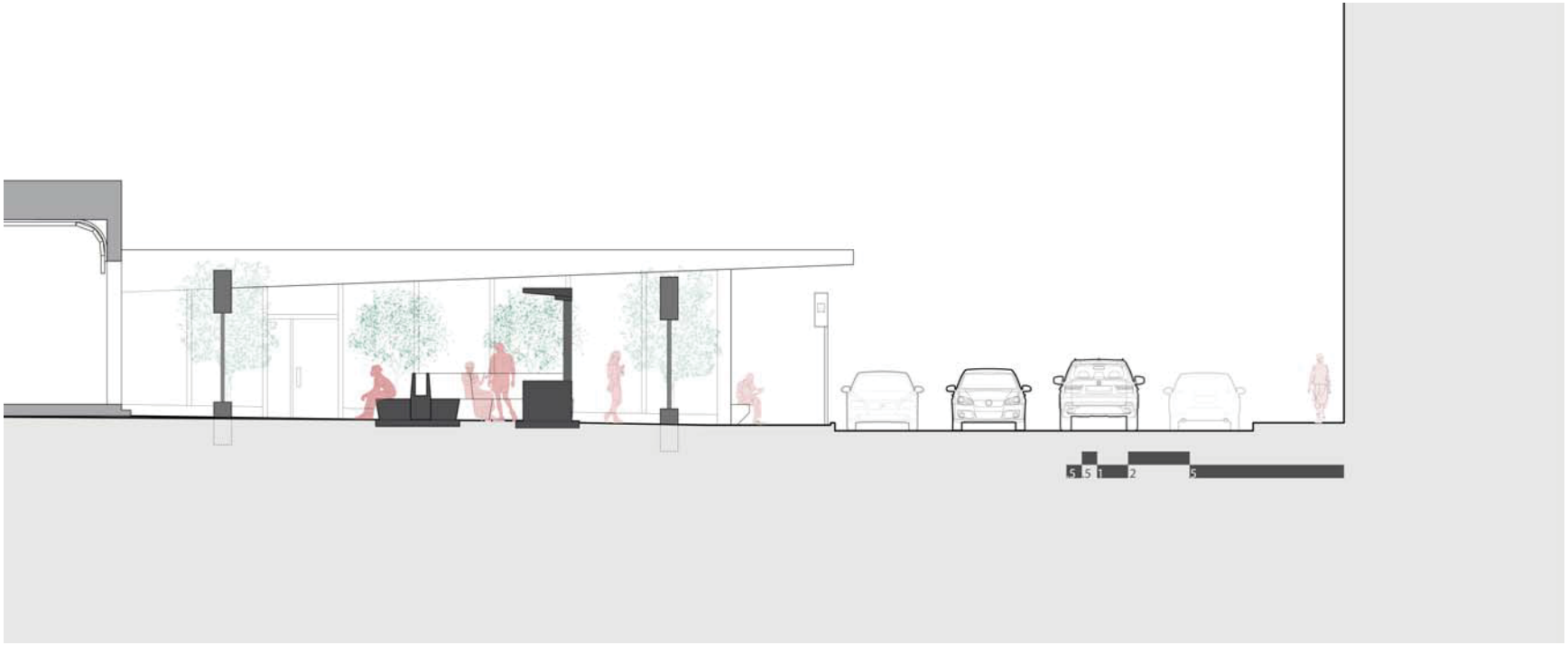


Fig. 63 Small - Plaza - Section - Seven Bays to Street

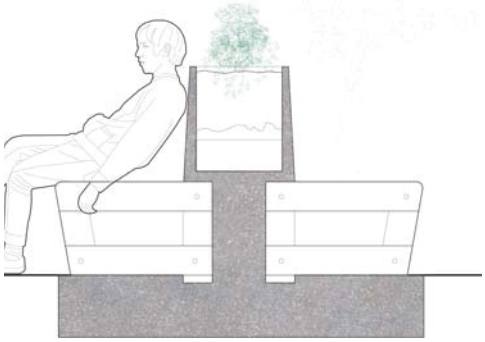


Fig. 64 Detail: Bench Section

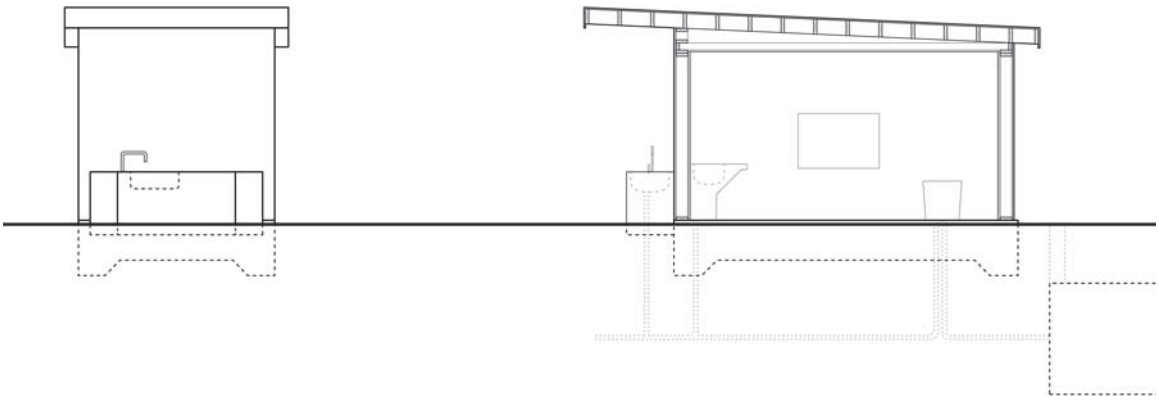


Fig. 65 Detail: Washroom Structure

overlap with the edge condition and spatial relationship principles, and the planters built into the benches, which overlap with the social relationship principle.

Further to that, making the ground condition a much warmer, softer material than the concrete sidewalk and asphalt roads makes the whole space much more welcoming, and puts the public at ease. The benches are constructed of wood slats in a repetetive pattern - again overlapping with the spatial relationship principle - and their hexagonal, undulating form mimics many natural processes. The water trough is a literal watering hole. The charging stations, with their lights and, in the colder months, heating lamps, are analogous to a fire around which people gather. The ‘room’ itself is reminiscent of a clearing in the woods.

Night and Winter

At night time, the tall lamp posts outline the space with light and contribute to making the adjacent sidewalks feel safer. The larger lamp fixtures built into the WiFi and charging stations feel like a fire around which to gather. People are free to use the washroom and WiFi stations through the night, and where people gather, people feel safe.

In winter, it is likely that outdoor spaces are used less often, particularly where weather is unpleasant, like in Halifax. That being said, people definitely don’t use public space in the winter when there is none maintained. Wooden benches do not become as cold as their metal counterparts in the winter, making the benches much more welcoming. Heat lamps built into the WiFi stations ensure at least marginal amounts of comfort for sitting outdoors in the cold for a little bit of time. It migth be idealistic to assume that heat lamps will be powered 24/7 through six months of the year (especially if financed by the municipality), but if we dare to dream, heat lamps might be the only warmth someone feels for weeks on end.

Given the size of the plaza, it is unlikely that any winter activities would occur on site. The plaza maintains its main programmatic use throughout the winter.

Fig. 66 Small - Plaza - Perspective

Medium

An overview of the Garden site, annotated with implemented principles, is seen ahead in Figure 67, followed by enlarged portions of the same drawing in Figures 68, 69, and 70. Figure 71 illustrates a section through the site illustrating the grade change, followed by its own enlargements.

The major ways each principle informed design decisions will now be explained.

Edge Conditions

The edge conditions at the garden site are driven by a vertical edge: a six-metre grade change between the Gottingen/front side of the site and the rear side of the site. This grade change was both a challenge and an opportunity. To soften the edge - or, rather, drop - the entire site is an ambulatory descent in a mixture of public space, circulation, and terraced garden patches. The descent is best seen in the overall section shown in Figure 71.

Each (l)edge is guarded by a railing of repeated wood slats - a similar language to that used for the bench at the small site - with, of course, matching wood hand rails or guard rails, depending on the requirement. These overlap with the spatial and biophilic principles.

Much of the separation between levels and ramps is interstitial space guarded by garden planters for use by the community garden. Occasionally, these planters also frame small social spaces.

The edge of the dog park is defined by two circulation paths that each cater to one of the main ways we navigate space: one is a direct route through the site, while the other hugs the safety of the building edge (refer back to thigmotaxis in Chapter 5 under Edge Conditions). As a dog park necessarily needs a fence, the same wood slat language is used to create a secure yet diaphanous edge condition. The repeated vertical wood slats also provide useful anchor points to tie dog leads to.

The greenhouse structure maintains a solid facade facing the street on its Northern

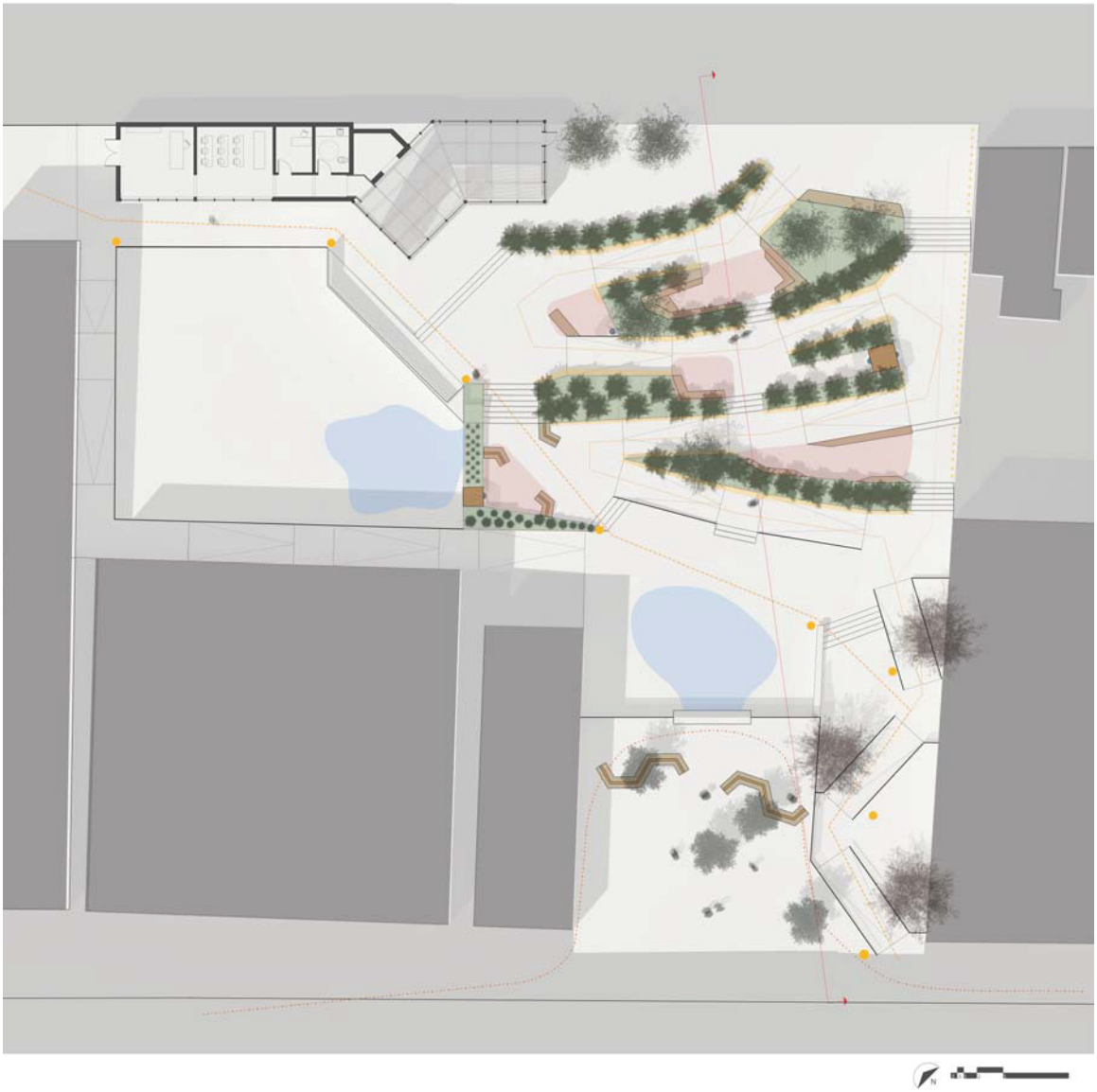


Fig. 67 Medium - Garden - Annotated Plan

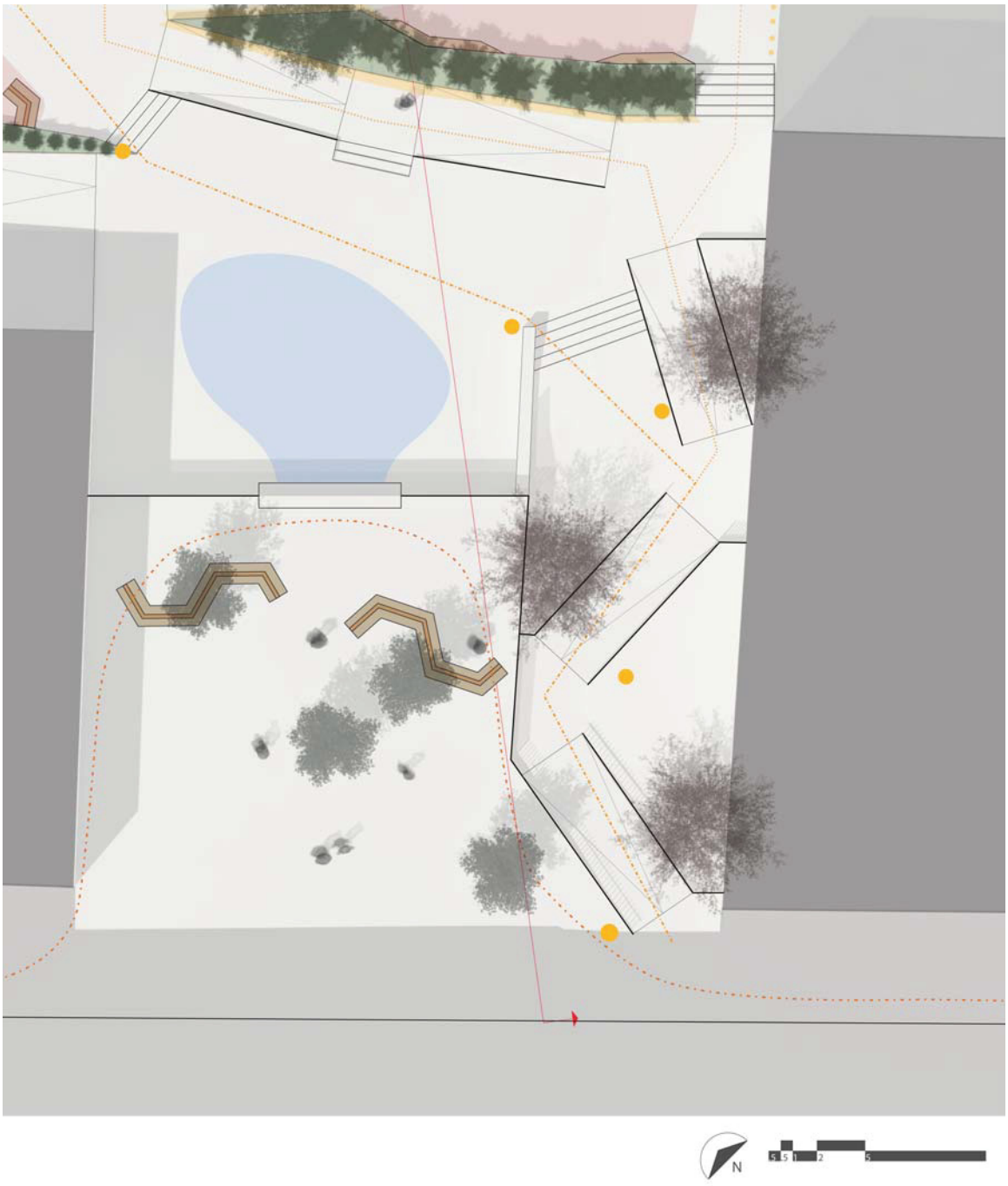


Fig. 68 Medium - Garden - Upper Level

Fig. 69 Medium - Garden - Planter Ambulatory

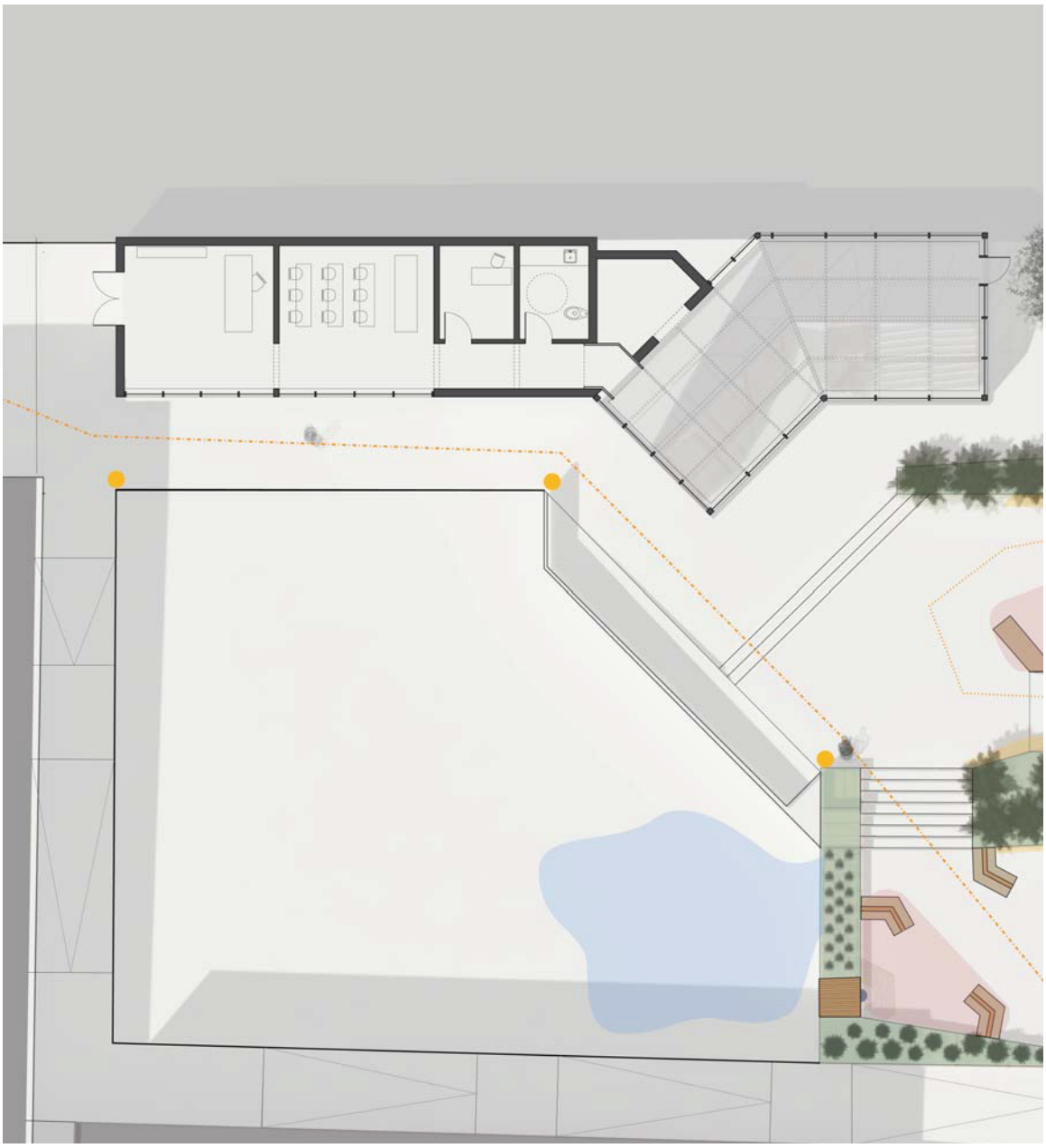


Fig. 70 Medium - Garden - Greenhouse and Dog Park

side, while its southern side facing the rest of the site is entirely glazed, delineating indoor/ outdoor space while stlil connecting the two visually. Plants also benefit.

Social Relationships

The Garden site deals with social relationships in three modes:

1) Through spatial hierarchies of more formal to more casual social spaces
2) Through program choices
3) Through chosen dimensions of spatial and formal elements

Each of these modes overlaps with other principles. The first - dealing with spatial hierarchies - starts with a more formal square at the top opening of the site. This square is intended as spillover terrasse space for adjacent restaurants and cafes, and can also accommodate medium-sized gatherings very easily. Because of the grade change from this square to the area below, it is also conceivably a good space for giving speeches or hosting peaceful protests; people can gather, protected, in the area below the plaza, hugged at the rear by the gardens, and a leader or performer can stand above at the guard rail of the plaza to address the crowd below (see Figs. 70 and 71). The next hierarchy of social space is the pockets of space formed between the garden planters and circulation ramps, easily visible in Figure 69 with pinkish overlay. These spaces are perfect for smaller groups of 3-8 people, either for general use or for the use of gardening workshops, for example. Finally, there are also lots of pockets that are best described as interstitial social spaces - wells of space that run off to the side of circulation paths, perfect for stepping aside and chatting to an acquaintance that one runs into, or for a bit of protected people-watching.

The second mode deals with narrative and pragmatic social organization through program choice. A community garden and new greenhouse structure empowers existing community organizations (see Meaning, Narrative and Place ahead for more) and ensures that the site is filled with people. The dog park is also an incredible social stimulator, as any dog owner might know instinctively, and also ensures that the foot traffic through the site is consistent. People are attracted to activity and other people, so these program choices don’t only benefit those participating in their specific activities - they also make the entire site seem safer, more inviting, and more interesting. Necessary elements for

Fig. 71 Medium - Garden - Section

the garden - such as compost and water pumps - double as elements that service the dog park, as well. Dogs can contribute directly to the fertilizer pile, while owners can rinse off their muddy paws easily at a water pump without getting in the gardeners' ways.

The third mode involves choices of dimension in spatial and formal elements. The largest endeavor in this regard is the concept of the entire site being accessible, especially given the grade change: every part of the site can be accessed by a barrier-free route. Beyond that, the barrier-free routes are not off to the side 'where they fit' and relegated to an item that needs to be checked on a list - the barrier-free routes are some of the most pleasant, celebrated circulation paths through the site, and ultimately form most of the terracing for the gardens. In addition, each pathway is the magical 3 m width, the Goldilocks dimension for social comfort. There are also several different paths to choose from - both barrier free and not - which contributes to the perception of control and safety. People can choose if they want to avoid a crowd or get close to it - no one is forced into any social situation they would feel uncomfortable in. More intimate moments are framed, and larger open spaces also accommodate larger gatherings.

Spatial Relationships

Much like with edge conditions, the spatial relationships driving the design of the Garden site deal with issues caused by the grade change and circulation considerations. Height changes inevitably create spatial hierarchies, which are minimized where undesired and allowed to occur where they have something to add, such as the level change at the top square described in the social relationship summary.

As far as circulation is concerned, meandering paths cannot be considered processionals without spatial indications of route - wayfinding devices. The annotated plans show the lighting schemes which serve this purpose. The most direct route across the site, from the top entrance at Gottingen St to the lowest point, the rear that connects to the Market site, is punctuated by larger interstitial spaces and tall lamp posts that are of the same language as those used to delineate the Small site. These tall lamps catch the eye as vertical beings and lead the way. The route that hugs the South-East edge of the site is quite a straight shot, occupying the space that is currently the public walkway that was described in the site overview. Being immediately on the edge of a site, the designer

Fig. 72 Medium - Garden - Section - Upper Half

Fig. 73 Medium - Garden - Section - Lower Half

has to be careful not to create a hard edge, which would be easy to do here. My solution was to use potlights installed in the ground, regularly spaced, creating an arcade effect out of light. The arcade language is also referential to the rhythm of the wood slats and other arcade strategies used throughout the sites.Finally, the route through the meandering ramp is lit by low-level washes of light given by elements installed in the sides of the planters. The smaller shortcut stairs are also then indicated by breaks in the light source. By using a low wash of light, attention is brought to the ground plane - indicating that this route is a softening of the grade change.

Meaning, Narrative, and Place

The main narrative of the Garden site is, of course, the garden. The ties to the Hope Blooms organization have already been explained. Collaborative and meaningful social activities drive both the place and how people socialize in it.

The other narrative of the Garden site is connection, in terms of circulation, in terms of connecting people to their community, and in terms of connecting the different public spaces. Having so much of the site dedicated to pathways is a physical manifestation of this narrative, beyond a happenstance result of appeasing the other principles. It becomes particularly clear in discussing the meaning and place of this site that, when thinking of each principle individually, the design process for eudemonic space snowballs and self-propogates.

Connections in terms of circulation and to the community are clear at this point. Connection to the Market occurs both physically and through the narrative of food production: food grown, processed, cooked, etc. on the Garden site is distributed and/or sold at the Market site. Usually, as consumers, the place we obtain and consume our food is far removed from where it is grown and processed. Reconnecting to the entire lifecycle of food production, even on such a small scale, overlaps biophilic and narrative principles. Giving spatial meaning and narrative to one of our basic survival needs also links this site to the Small site, where basic (modern) survival needs are also addressed.

Biophilia

The obvious biophilic features of this site have been touched upon in the periphery

of the other principles. The program choice, both literally biologic and in narrative, as well as the presence of other trees, plantings, and the dog park all contribute to the biophilic condition of the site.

The terrace-like circulation along the site is also biophilic: the forms are reminiscent of natural riverbeds that terrace through water erosion. People ‘flow’ along the paths.

The water pumps also act as ‘watering holes’ much like the water trough at the Small site.

Night and Winter

Fig. 74 Medium - Garden - Aerial Perspective

Fig. 75 Medium - Garden - Perspective

Each principle also contributes to the use of the Garden site at night time. The thorough lighting ensures that all parts of the site feel safe at all times. The attraction to the Market site adjacent will ensure that there are eyes on the street at this time, as well, while still allowing for the Garden site to feel a little more peaceful and secluded. Public space at night time should serve not just late night revelers but also the public who may work at non-typical hours.

In winter, the garden beds as tools for gardening become less useful. Instead, consider that they are beds for snow removal from the pathways: children can use mounds to make forts, or snow men. The open area below the square can be iced and turned into

Fig. 76 Medium - Garden - Winter Occupation

a casual rink. Enjoyment of the site is still possible in the winter, and even encouraged: let us reject the notion that outdoor public space is only used in the warm months. Dogs will still need walking. People will still want to spend time outdoors. Figure 76 imagines the site use during the winter months.

Large

An overview of the Market site, annotated with implemented principles, is seen ahead in Figure 77, followed by enlarged portions of the same drawing in Figures 78 and 79. Figure 80 illustrates a section through the site illustrating the grade change, followed by its own enlargements.

The major ways each principle informed design decisions will now be explained.

Edge Conditions

As a more civic and formal site, the Market's focus on edge conditions lies at the building edge or envelope, and the edges between it and the road. Similarly to the Garden site, the grade change issue also affects the edge conditions of the site.

A single move that deals with both of these edge conditions (building to road, and vertical grade change): a stair and ramp processional that acts as a buffer between the building and the side road. The building envelope itself is entirely glazed, glass being the most visually diaphanous material that allows for environmental control inside. Visually sofening the edge of the building requires more than transparent walls: each exterior 'landing', repeated along with the terracing of the market itself, is covered with a canopy to shade entrances and indicate an expanded threshold boundary. These are primarily supported by cantilevered beams extending from the market structure, but secondarily supported by wood slat supports that house climbing plants as a way to softly separate each 'landing'. Moving away from the building towards the road, barrier-free ramps navigate the incline and ensure that deliveries from the street can roll into the market without having to deal with stairs. Finally, the existing sidewalk has been overtaken and replaced with a wider, more terraced path that alternates between a few steps and flat platforms (also contributing to the rhythm of the descent).

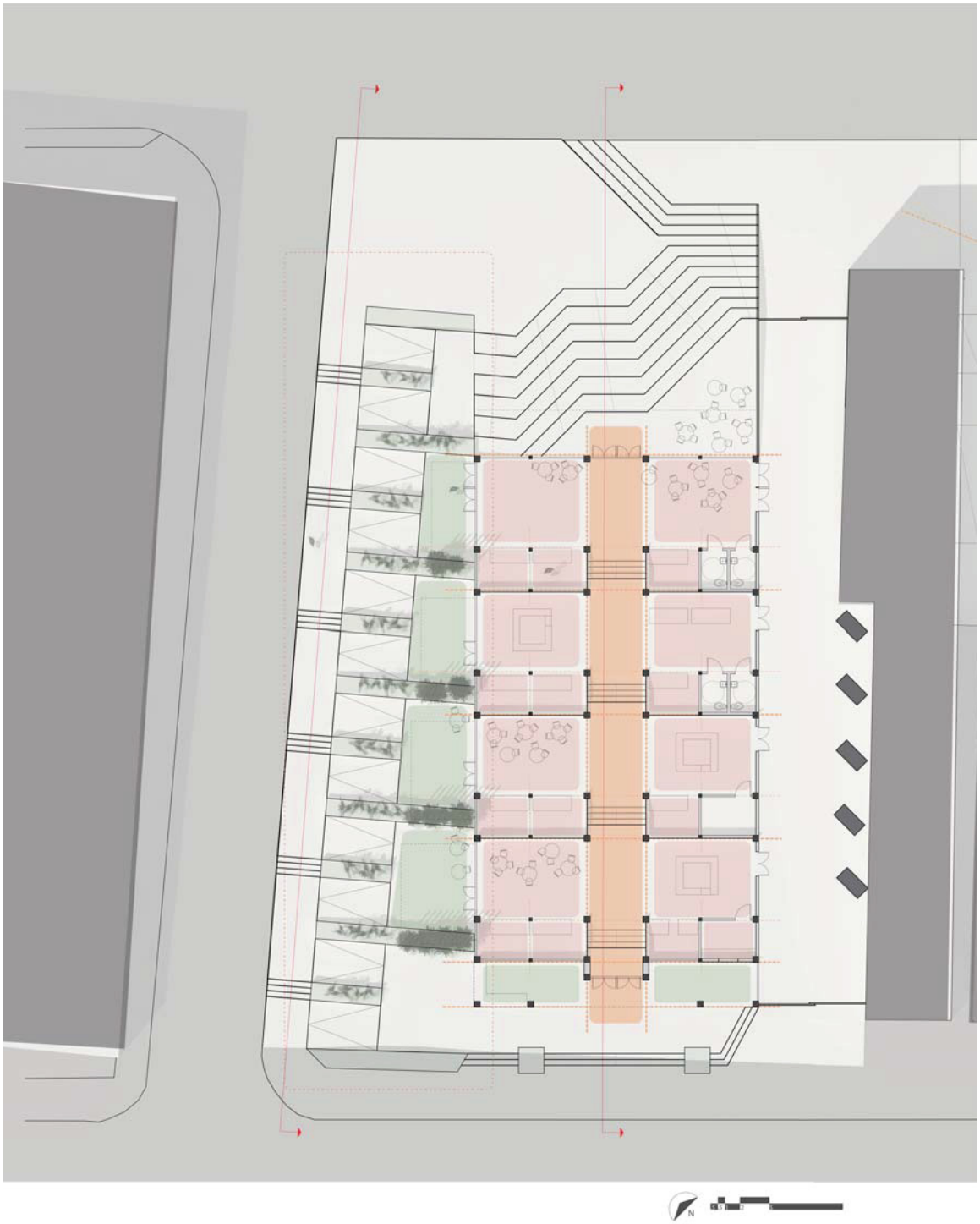


Fig. 77 Large - Market - Annotated Plan

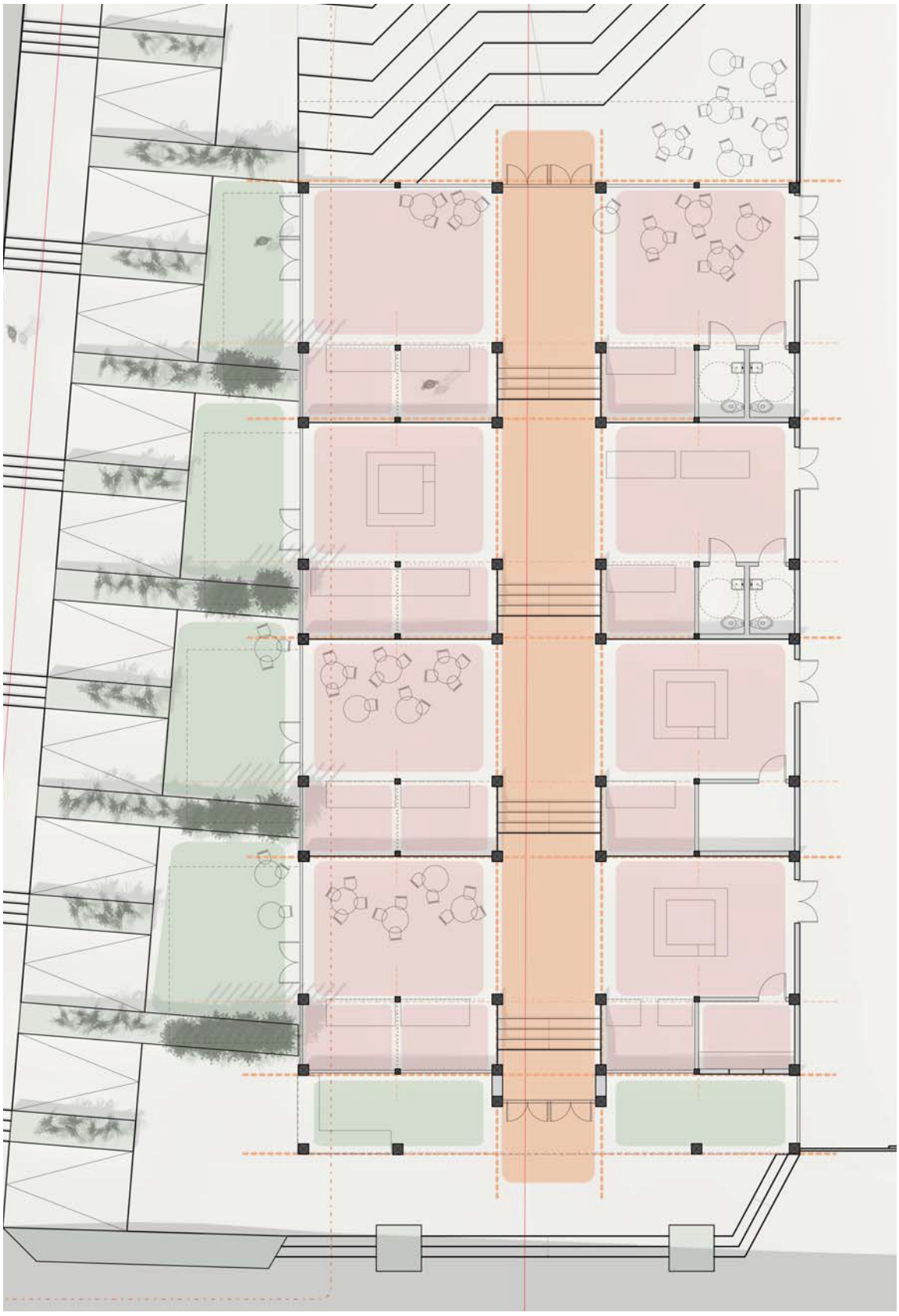


Fig. 78 Large - Market - Annotated Plan Enlarged

From the road to the building, we move from most open to most enclosed in a layered, hierarchical fashion.

Inside the market building, the grade change is dealt with by terracing the structural bays which also contributes to the social and spatial relationships of the building. The roof, which can be thought of as the edge condition between the building and the sky, is also terraced, but uses a single-pitched factory roof style to soften the horizontal delineation and provide opportunity for mroe natural light (biophilia).

At the rear of the market, softly sloping steps close the last of the grade change and will be touched on in several of the other principles as well.

Social Relationships

In the annotated plan, social relationships are annotated with a soft pink colour. In the Market, social distances informed the spacing of the structural elements and overall dimensions. Each market stall is suitably sized for one person to be working behind a booth, converse with and exchange goods with a person at the booth, as well as some extra room for people to wait in line and browse the booths without contributing to overcrowding. Two booths side by side are about the width of a medium gathering space, and the depth of each terrace is the addition of that medium gathering space, plus circulation, plus the stalls. Movement is more likely to occur within 3 metres of the market stalls, which leaves just over 3 metres for the gathering space. The central circulation axis is 4 metres, because people are more likely to be in the market in groups or carrying extra bags than alone or just passing through.

The total length of the market interior just about maxes out the distance at which we can discern body language - making it about the length of a typical theatre. This contributes to the adaptive quality of the space, as does the terracing.

When not used traditionally as a market, the building can also be used to host events, concerts, plays, exhibitions, classes, etc. The open nature of the roof structure allows for temporary divisions to be easily put in place, and the structural elements correspond with the usable spaces. At night, the building remains open, which allows food

Fig. 79 Large - Market - Site Section and Building Elevation

Fig. 80 Large - Market - Site Section and Building Elevation Enlarged

vendors to set up for diners or late night snackers. Having people, activity, and welcoming, well-lit space contributes to the feeling of safety on a stretch of street that typically feels a bit unsafe at night. The glazed facade lets the market act as a lantern to warm the block. This overlaps with both narratives common to all the sites, as well as biophilic and spatial principles.

Spatial Relationships

In the Market, the spatial relationships that inform design impact the form and structure of the building itself, and the spatial blurring between interior/exterior that speak to the edge conditions and narrative.

The larger social areas mentioned above are framed by the largest structural members - solid timber frame - while smaller supports delineate the subdivisions (e.g. between market stalls, on etiher side of the central circulation corridor). Roof trusses sit on large, solid beams, creating rhythms while the webs play with the light and create patterns akin to light coming through a forest canopy (see biophilia). There are no roof trusses at the central corridor, giving it a lengthened feel and a higher rank in spatial hierarchy - it's also an axis of symmetry, after all.

The large timber beams extend over the exterior 'landings' to support the shading canopies. Extending structural elemenets from interior through exterior is a physical manifestation of extending the market space outside.

Meaning, Narrative, and Place

The market as an archetype speaks to both the narrative of food production and pure public space - it is, in many ways, the building archetype closest to the agora. Aristotle linked the qualities of the agora to his eudemonic theories - it is a necessary part of the city, after all. The rear sloping stairs function as an informal amphitheatre, which can be used for concerts and festivals as much as it can be used for speech giving and protest organization.

Beyond simply a place for the exchange and distribution of goods, its multiple uses have been touched upon. In many ways, the Market becomes a more casual,

Fig. 81 Large - Market - Building Section

Fig. 82 Large - Market - Building Section Enlargement 1

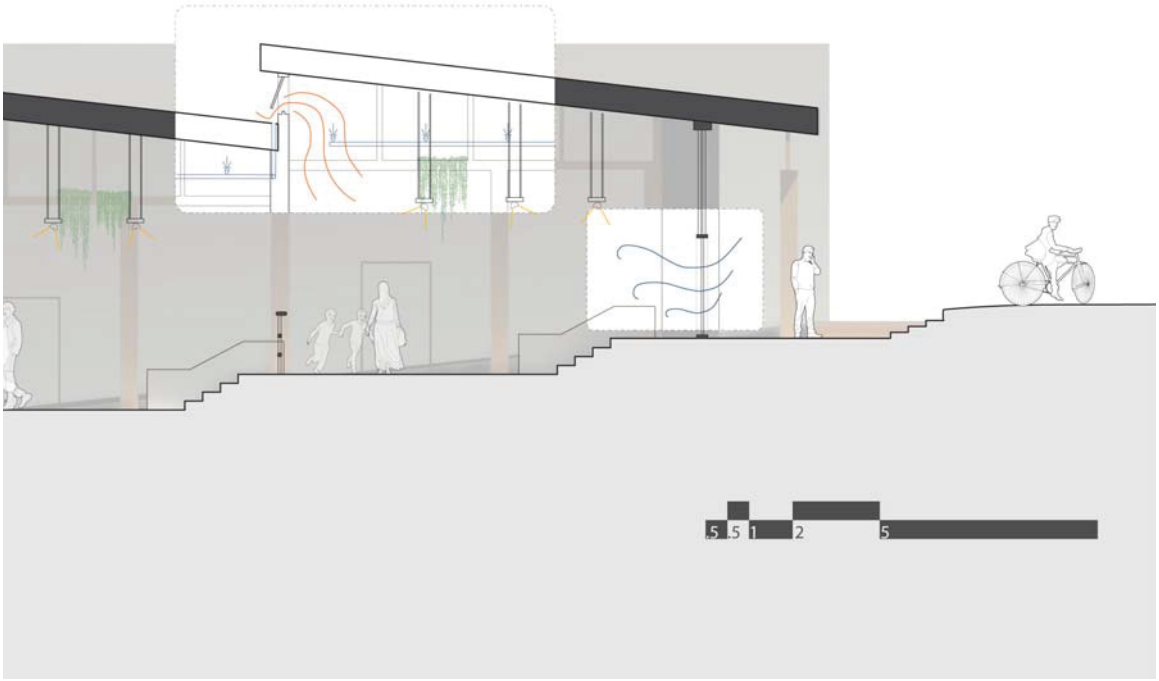


Fig. 83 Large - Market - Building Section Enlargement 2

more accessible community centre, without the narratives of bureaucracy, government, authority, charity, or identification of supposed downtrodden groups. The market is a place for all to gather, exchange, and participate in meaningful social interaction and activity. Its design has been considered with the perception of space in mind. At night, a lantern, in weather, a refuge, the market building is the landmark of eudemonic public spaces along Gottingen St.

Biophilia

The Market site has the least planting percentage of all three sites, but in many ways it is still very biophilic.

The post-and-beam structure of the market, with the repeated roof trusses above, create a similar effect as a forest with light dancing through the canopy. The space is softly lit by Northern light throughout most of the day, which is a gentler light than Southern light and doesn't heat glazed spaces in the same way.

Atmospherically, the market is minimally serviced for comfort with heat lamps that hang from the ceiling and operable ventilation openings at the roof level (see Figures 81-83). Feeling the coolness of a rainy day while inside the market is consistent with the

Fig. 84 Large - Market - Stramp Perspective at Night

Fig. 85 Large - Market - Rear Perspective

visual and spatial blurring of the edge of the building.

The rear sloping stairs, doubling as amphitheatre, function much the same way as a gently sloping lawn: people will sit and stretch out, set up a picnic and all hang out together but facing the same direction (thereby not required to interact), which is always a popular social condition in a public space.

Envisioned Use and Impact of Design

While I am in no way qualified to asses the psychological impacts of the design, nonetheless I will elaborate on how I hope the use of these designs will contribute to individual and community Eudaimonia in the neighbourhood.

Encouraging the inclusion of all peoples - not just by ‘saying it’ but by not designing defensively, designing celebrated barrier-free circulation, and rejecting privatization - might hopefully contribute to the factor of Self-Acceptance at both the individual and community levels.

Providing social opportunities at a wide variety of scale and degree of interaction contributes to the factor of Positive Relationships with Others at the individual level. Empowering community engagement reflects on the neighbourhood and affects its relationship with the rest of the city, affecting the factor of Positive Relationships with Others at the community level.

Facilitating circulation for people with physical disabilities and providing amenities contributes to the factor of Autonomy at the individual level. Providing infrastructure for community-run organizations and efforts conrtibutes at the community level.

The use of patterns, wayfinding devices, and careful consideration of cognitive cues for spatial navigation and occupation contributes to the factor of Environmental Mastery at the individual and community levels. Further, the narrative of ‘grow your own, sell your own’ driving the Garden and Market sites contributes to this factor in ways beyond the built environment - environment, as a word, means something different to psychologists than to architects, after all.

The overall contributions of the sites to community well-being hope to empower people in developing meaningful social relationships and participating in activities that directly contribute to their wellbeing. This can conceivably impact the factor of Purpose in Life. The opportunities for networking, learning and developing skills, and entrepeneurship provided by the site impact the factor of Personal Growth, both at the individual and community level.

“If Ony”: Post-Occupancy

In an ideal world, portions of this project would be completed and evaluated with post-occupancy studies to assess their efficacy. Also in an ideal world, the architect could control every way their spaces are used and the narrative of the places theyve designed. In this world, however, one must relinquish some control and understand that ‘problems’ or unintended consequences that are discovered post-occupancy are in fact helpful tools, particularly if one has the resources to survey and gather data. A limitation in determining the ‘success’ of these projects is that we will never know, empirically, their impact on eudaimonic well-being, but I posit that built projects interested in such outcomes should invest in post-occupancy studies to better the study of neuroscience, psychology and architecture.

Chapter 7: Conclusion

Ability to Design Within Framework of Principles

The framework of the Principles is at once specific and broad, and it is easy to incorporate them into the design process because many thought processes and considerations they incur are already traditionally part of the design process for many architects. If architects are masters at budgeting where to put time and money in a project for best results, the Principles are a shortlist in terms of the architect's energies.

The principles encourage continuing education, investigations, research, and consultation, which all contribute to better designs, whether or not they are related to eudaimonic principles. Given the youth of many related fields, new research and findings are emerging in real time, and so new tools for design are becoming available to us. The principles guide us so that we might not drown in a sea of information, but they don't limit the artistic expression and stylistic choices that make architectural design pleasureable and interesting.

Successes of the Principles

I consider the principles successful in that they guide certain decisions in the direction of an eudaimonic architecture. In design, there are an infinite number of places one can spend time and energy, and I believe that spending that time and energy on the principles resulted in projects that are considerate of and sensitive to the big factors of the built environment which impact psychological well-being.

Nothing is comprehensive, nothing is perfect, and this is especially true for issues of art, the mind, psychology, and perception. The principles hit an appropriate spread of big picture factors and details (both figuative and architectural) in a way that sketches out a well-rounded consideration of eudaimonic architecture. If architecture is, all at once, context, tectonics, materials, social organization, and spatial organization, likewise the principles inform and guide all of those considerations.

Future Development and Alternative Contexts

This thesis focuses on public space, but residential spaces are also huge parts of our everyday lives. The scope of this thesis was necessarily limited to public space, but assessing the principles in the design of residential spaces and mixed use spaces would be a valuable investigation. Whether there are additional considerations or changes to the principles is a curiosity of mine.

Looking Forward

What is my hope at the conclusion of this research? Some final stances this thesis takes in its completion, and looking foward:

1) That the consideration of how designed spaces impact our well-being becomes a standard design consideration and not a niche or specialty approach - much like sustainability designers have argued for their field (and this is slowly but surely becoming the case for them).

2) That the values of this approach to design are seen by professionals outside of the architectural field (planning and municipal offices, developers, etc); that it is better understood that happy communities are more productive on all levels and worth investing in, financially and otherwise.

3) That research continues in earnest so that architects can feel more confident about the choices they make, and make them more intentionally.

4) That pre- and post- design phases are considered less ‘superfluous’ and more useful: site and context research, community consultations, and post-occupancy studies can only improve the efficacy of designs.

5) Finally, that skilled architectural design is considered a necessary and meaningful process in the design of public spaces, beyond legal and aesthetic considerations.

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