智慧城市始于智慧设计
Smart Cities Start with Smart Design

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摘要：在智慧城市设计的各个领域中，科技最受关注，而空间设计最不受关注。但从城市建设的角度来看，现实应该正好相反。成功的智慧城市首先需要从根本上保持大城市始终具有的基本特质，它们必须是可以反复记录人类生活复杂性和多样性的载体。当前城市中的智能化数字网络必不可少，也应该加以整合，但我们更应该重点关注卓越的实际城市场所营造。目前，多伦多可能是全球最受瞩目的智慧城市创意试验场，基于此，主要详细介绍 Sasaki 事务所在多伦多大都市区设计的 2 个案例研究。
关键词：智慧城市；智慧设计；科技；场所营造；生活质量；福祉；可持续；气候变化；都市主义；城市规划；城市设计；Sasaki 事务所

Abstract: Of the various facets of Smart City design, the one that receives the most attention is the technological. The one that receives the least is that of physical design. From a city-making point of view, the reality should really be the exact inverse. Successful smart cities must fundamentally first uphold the basic conditions that have always characterized great cities. They must be the tablet upon which the richness and complexity of human life can be written and rewritten a thousand times over. Intelligent digital networks in cities are of course now essential; their incorporation should be a given, and from there, focus should be on excellence of actual urban place-making. Toronto is perhaps the most interesting test-bed for Smart City ideas in the world right now, here we look at two case studies by Sasaki in the Metro region.
Keywords: smart city; smart design; technology; place-making; quality of life; wellness; sustainability; climate change; urbanism; urban planning; urban design; Sasaki

在智慧城市设计的各个领域里，往往最受关注的是科技，最不受关注的是空间设计，但从城市建设的角度来看，实际情况应该是完全相反的。为什么事实并非如此，这很大程度上与我们这个时代所特有的社会对科技的痴迷有关，而且实际上，智慧城市的蓝图是由许多大型企业所主导的。 例如，思科系统（Cisco Systems），一家被评为道琼斯指数（Dow Jones Index）和《财富》世界 500 强的公司告诉我们："智慧城市利用数字科技来连接、保护和改善大众的生活。"恰好，它有一些设备可以卖给你，而这并非偶然。

毋庸置疑，在智慧城市的整个概念中充斥着金钱的影子。大型科技企业、咨询公司、计算机硬件和软件制造商们都坚定地宣称，这是一个双赢的局面——有利于他们的事情，我们也将从中受益——但从智慧城市建设中获利的动机，使得他们对"智能化"（smartness）为城市居民带来效益的评估远没有那么客观。众所周知，设计出能够更好地接纳科技的城市，这本质上是件好事，可是如果它实际上不利于人性场所的营造，而其实更有利于企业生产好的产品呢？很显然，这将会出现为数字而设计的方法来适应科技的局面。

毫无疑问，设计师和规划师也会感到兴奋，因为现在城市可以高效地整合大量监控和运

1 湖景村城市设计平面图
　Lakeview urban design plan
2 城市设计概念图
　Urban design concept diagram

营技术。但同时，我们要确保这种热忱不会导致我们忽视营造良好场所的基本原则，而变得本末倒置。成功的智慧城市首先必须从根本上保持大城市始终具有的基本特质，它们必须是可以反复记录人类生活复杂性和多样性的载体，而这只有通过城市的内在结构（inherent framework）才能得以实现。大型科技企业希望我们相信他们的产品将成为城市的 DNA，而事实上只有城市的结构才是它的 DNA。

尽管科技是新的，但关于如何将科技融入城市的问题已经延续了几个世纪之久。例如，回想上一个科技奇迹（汽车）是如何在20 世纪颠覆了人性场所的营造，并且造成了严重的社会和环境问题，至今我们都在解决这些影响。洛杉矶过去了给汽车让路，拆除了公共有轨电车，一个世纪后的今天，又耗资数百亿人民币（数十亿美元）来恢复它。没有比这更能说明对新生事物的迷恋会破坏曾经对人类有益的东西。同样地，在 20 世纪50—60 年代，高架高速公路穿过北美的每个主要城市，从而导致了社区之间的割裂、城市与滨水地区之间的割裂。我们现在正在寻找方法来摆脱这些碍眼的、带来污染和颓败的东西。2000 年，波士顿在"大挖掘"（Big

Dig）项目上花费了上千亿人民币（140 亿美元）；最近，多伦多选民就嘉丁纳高速公路（Gardiner Expressway）的停建问题展开了激烈的争论，因为它将会把这座城市与安大略湖（Lake Ontario）分隔开。

出于某些原因，多伦多可能是目前全球最受瞩目的智慧城市创意试验场。其中最重要的是，它是这个对外界控制信息持怀疑态度的民主国家中最大的城市，这是一个很好的基础。在保护市民权益的前提下与外界企业建立各种合作关系。备受瞩目的人行道实验室（Sidewalk Labs）项目将在多伦多海滨的几个街区打造一个模板，这是令人兴奋的，因为多伦多决心要成为创建未来城市的引导者。人行道实验室项目将如何发展还有待观察，但它很有可能就像阿布扎比（Abu Dhabi）的马斯达尔（Masdar）那样，只是个例而无法成为可复制的模板。

另外，多伦多值得关注也因为它是一个"巨无霸"城市（juggernaut）。到 21 世纪中叶，它有望取代洛杉矶成为北美第二大城市，目前处在全力快速（pedal-to-the-floor）增长阶段。然而与以往的快速发展期不同，尽管增长需求（以及加拿大的土地供应量）巨大，但多伦多不希望继续成为北美扩张最快的城

市之一。因此，该城市周围环绕了一圈绿带，希望城市扩张能够被限制在绿带内。这也可能会使城市扩张区内的土地变得更加密集，以满足未来的需求。在现有大部分低层建筑结构的基础上发展虽然很复杂，但可能更环保可行，并且从长远来看，在财政上也具有可持续性。

在这种发展背景下，Sasaki 事务所目前在大多伦多地区（Greater Toronto Area, GTA）的城市扩张区内有 2 个重大项目。这 2 个项目就像书挡，一个在城市东面，一个在城市西面。它们本质上是完全不同的，但是两者都体现了对智慧城市设计本质的态度。两者都首先寻求建立一个精细而具有弹性的框架，以便为人们创造优质的空间。科技（包括尚不为人所知的科技）被视为是必不可少的，而智慧框架的设计为其做好了充足准备。我们的目标是利用新兴科技来支持和促进美好城市的建设，但要确保美好城市的建设仍然是一切努力的前提。出行、环境卫生、公民参与、数字"孪生"和可持续发展等问题都是社区可以改进的主要方面，在 2 个多伦多项目的规划和城市设计中都考虑了这些内容。

安大略湖沿岸西部的湖景村（Lakeview Village）①将被打造为一个混合型社区。它位

3 交通和流线概念规划
Transit and mobility concept

4 湖景村滨水步道效果图
Lakeview waterfront promenade

5 湖景村滨水公园效果图
Lakeview waterfront park

6 湖景村空间密度控制规划
Lakeview density concept

7 湖景村广场效果图
Lakeview Square

8 创新中心效果图
Innovation district hub

于一块约 71.6 hm²（177 英亩）的棕地上，该地在 20 世纪下半叶曾是一个大型燃煤发电厂的所在地。这个社区将包含 8 000 个供各种类型家庭居住的住宅单元、一个海滨酒店、一个占地约 14.9 hm²（160 万平方英尺）的创新区（Innovation District）、约 1.9 hm²（20 万平方英尺）的商业用地、约 1.2 hm²（3 英亩）的城市学校用地，以及 20.2 hm²（50 英亩）与区域绿网相连的公园。它与主要的通勤火车站（可沿着海滨步行道或自行车道到达）相距不到 1.5 km，25 min 内可以从火车站直达多伦多市中心。总体而言，从土地利用和规划的角度来看，湖景村对大多伦多地区，甚至对北美城市都具有重要意义，因为它为逐步实现大多伦多地区的目标做出了贡献，即在城市扩张区内增加密度，并且在工作场所和公共交通周边提供必要的住房。因此，湖景村是一个可实现理想密度的模板，它利用现有基础设施，通过减少通勤和建立强烈的社区意识以及环境因素（协作式全站点系统，并减少对私人汽车的依赖）来改善生活质量。然而，湖景村之所以成为一个可复制的智慧设计研究案

例，是因为它具备宜人的尺度以及格网结构大小合理的街区，并在整个社区中融入绿色空间（如果不考虑它的峡谷地区，大多伦多是人均公共绿地最少的北美城市之一），同时也结合了周边现有的城市元素。区域能源、真空废物处理技术、可转换停车位、大量的自然采光及其他措施将使湖景村成为一个智慧社区，但最初这是通过智慧城市设计框架实现的。

位于东部的维尔雷尼（Veraine）[②]将成为皮克灵市（Pickering）的一个新社区，该社区位于城市扩张区的边缘，这片土地目前主要用于种植动物饲料作物。由于将在附近修建多伦多的第二大联邦机场，以及多伦多房地产市场一直以来对地面入户住宅产品的需求，这个大多伦多地区的东北角可能会在未来数十年发生重大变化。与湖景村不同，维尔雷尼很长一段时间需要自给自足。因此，它被看作是一个有界社区（bounded community），在公共机构和商业中心周围紧凑地建起混合型住宅区。虽然维尔雷尼和湖景村一样采用了格网结构，但是它的规模完全不同。鉴于维尔雷尼的规模很大（占地 4 000 英亩，约合 16 km²，可容纳 6 万居

民，提供 4.5 万个就业机会），而且建设周期很长，因此充分考虑了未来无人驾驶汽车及各种其他科技的需求。Sasaki 事务所认为，有必要果断地打破 20 世纪晚期郊区的布局特征，即随机的曲线和（尽端路造成的）刻意的不连贯。取而代之的是相反的方式：即最大化的连通性，通过可步行和骑行的绿道将社区内的许多节点连接起来。Sasaki 事务所将维尔雷尼的格网结构旋转为"正北"朝向布局，以最大限度地利用太阳能和自然采光，并与现存的 18、19 世纪较大模数的上加拿大（Upper Canada）格网参考系统形成一种恰到好处的关系。结果 2 种格网之间产生一系列不规则且具有自然特征的交叉点，它们在社区肌理内创造了自由、开放空间和地方特色，同时保持了维尔雷尼格网的潜力，使其成为一个可以应对未知未来的真正可行的框架。目前的农业用地会向当地水源排放氮肥，但这些用地将被新的社区所占用，经过精心设计后，维尔雷尼的地表状况将得到很大改善。未来所有的径流将被滞留和渗滤，场地实质上变成了"海绵"，因此将大大改善本地水源状况。在交通方面，

9 可持续发展概念框架
Sustainability concept

10 从南往北看的湖景村
View of Lakeview from the south

11 湖景村面向安大略湖的俯视图
Lakeview aerial view towards Lake Ontario

快速公交系统将在中短期内为社区服务，而在长远的未来将被铁路系统取代。通过设计将最大化实现这 2 个目标，以及整个社区的二级交通系统，它将"邻里节点"与交通枢纽连接起来。与湖景村一样，随着共享单车和无人驾驶汽车的增多，该社区已经在研究将来转换或取消当前的停车位。因此，维尔雷尼社区的空间框架使其能够融合尚未出现的智能科技，而不会影响作为一个人性场所的社区结构。

现在，城市中的智能化数字网络当然必不可少，也应该加以整合，但我们更应该重点关注营造美好的实际城市场所。未来，设计师和公众将不得不挑战自我，以避免城市的发展变成为了科技而科技，而是要认真考虑需要结合什么样的科技。我们应该自问，在不影响人类体验的前提下是否可以合理地包容科技，或者什么样的科技可以被用来构建一个更好的城市结构？汽车的发展史表明，这需要城市规划者和开发商保持警惕，并在一定程度上保持客观态度，以确保科技真正有益，而不仅仅只是让人欣喜若狂并可以从中获利。

Sasaki 事务所的场所营造策略就是基于这种理念。在我们的策略中，期望融入能够改善生活质量和环境因素的智慧城市元素；车辆、行人、建筑物及其居住者都相互联通；真空废物收集将取代道路上行驶的柴油垃圾车；区域能源创造协同效益和环境收益，将生态方面的考虑提升到重要位置——现在这些已成为必要。我们为"未知的不确定"（unknown unknowns）设计框架，但首要原则是为人们打造一个美好的居所。没有放之四海而皆准的办法，当然也没有秘诀。我们倡导一种融合了集体智慧和世界经验的理念与情感。好的城市设计首要任务是追求人本主义，其次才是追求科技。

注释：
① 湖景村的业主为 Lakeview Community Partners Limited（LCPL）。
② 维尔雷尼的业主为 Dorsay Development Corp.。

图片来源：
图 1~3、6、9、15~16、18~19 © Sasaki；图 4~5、7~8、10~14、17、20 © Cicada。

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Smart Cities Start with Smart Design

Of the various facets of Smart City design, the one that receives the most attention is the technological. The one that receives the least is that of physical design. From a city-making point of view, the reality should really be the exact inverse. Why this isn't the case largely has to do with a societal techno-enthrallment that characterizes our age, and the fact that the smart city narrative is being driven by corporations. Cisco Systems, for example, a Dow Jones Index and Fortune 500 company tells us that "A smart city uses digital technology to connect, protect, and enhance the lives of citizens." Cisco, not coincidentally, has some equipment to sell you.

Without question, there is a haze of dollar signs hovering around the entire concept of the Smart City. Big tech, consulting firms, computer hardware and software makers, are forceful in their assertions that this is a win-win scenario — that what's good for them is going to also be very good for us — but their incentive to cash in making cities smarter makes their assessment of the benefits of "smartness" to

12 湖景村往多伦多市中心望去的景色
View of Lakeview towards downtown Toronto

13 湖景村公共水道
Lakeview waterway common

14 公共水道冬季夜景
Waterway common on a winter evening

city-dwellers far less objective. We are told designing cities better able to accept the layer of technology is inherently good, but what if it actually interferes with good place-making for people, and is actually more about good product-making — for companies? It is easy to imagine a design-to-the-numbers approach for the accommodation of technology.

To be sure, designers and planners are also excited that cities can now incorporate a large amount of monitoring and operating technology with efficiency. At the same time, we want to make sure this zealousness does not lead us to neglect the fundamentals of good place — making, letting the tail wag the dog. Successful smart cities must fundamentally first uphold the basic conditions that have always characterized great cities. They must be the tablet upon which the richness and complexity of human life can be written and rewritten a thousand times over. The only thing that enables this is the inherent framework of the city. Big tech would have us believe that their products will be the city's DNA, but only the framework of the city can be its DNA.

While the technologies are new, the questions around how to integrate tech into cities are centuries old. Consider, for example, how the last technological miracle, the automobile, upended place-making for people in the 20th century, and created major social and environmental issues, the effects of which we are grappling with now. In Los Angeles, public trams were infamously ripped out to make way for cars. Now, a century later, and at a cost of billions of dollars, that transit is being put back in; there is no better example of a fixation on

shiny new objects undermining what was good for a population than this. Equally, in the 1950s and 1960s, elevated freeways were carved into every major North American city, cutting neighborhoods off from one another and cities off from their waterfronts. We are now looking for ways to get rid of these eyesores and generators of pollution and blight. Boston spent $14 billion dollars in 2000 on the Big Dig; Toronto voters recently waged a bitter fight over the grounding of the Gardiner Expressway, which separates that city from Lake Ontario.

Toronto is perhaps the most interesting test-bed for Smart City ideas in the world right now, for a few reasons. Foremost amongst them is that it is the largest city in a democratic country with a skepticism of outside control of information, which is a good starting point. Partnership with outside entities is arranged in ways that protects citizens' rights. The high-profile Sidewalk Labs project to create a template on a few blocks of Toronto's waterfront is exciting because of Toronto's determination to be a leader amongst cities for creating the urban future. It remains to be seen how things play out with Sidewalk Labs' project, but there is a distinct possibility of it being more of a one-off than a template, as Masdar in Abu Dhabi has proven to be.

Toronto is also of importance because it is a juggernaut. Projected to overtake Los Angeles as North America's second largest city by mid-century, it is in pedal-to-the-floor growth mode. Unlike in previous boom cycles, however, Toronto is not keen on continuing to lead as one of North America's sprawlingest cities, even though growth demands

(and Canada's supply of land) are substantial. A greenbelt has thus been looped around the city, with the hope that growth can be contained within the belt. Lands within the urban growth boundary are expected to densify to meet future needs. The backfilling of the existing, mostly low-rise fabric, while complex, will likely be more environmentally viable, and in the long run, financially sustainable.

Within this dynamic context, Sasaki currently has two major projects inside the urban growth boundary of the Greater Toronto Area (GTA). These literal bookends to the city — one in the east, and one in the west — are completely different in nature, but both embody attitudes towards inherent smart city-design. Both seek to first and foremost put in place an elegant and resilient framework, in service of the creation of great places for people. Technology — including that which is not yet known — is viewed as essential, and abundant provision is made for it through the design of smart frameworks. Our goal is to use new and forthcoming technologies to support and enhance good city-making, but ensure good city-making remains the foundation of any such effort. Mobility, sanitation, citizen engagement, digital "twinning," and sustainability are all major opportunities for improving communities, and in both of our Toronto projects, we have accounted for these dimensions in the planning and urban design.

Lakeview Village[1], in the west will be a mixed-use community on the Lake Ontario shore, on a 177 acre brownfield site that for the last half of the 20th century was home to a large coal-fired power plant. It will include 8,000 residential
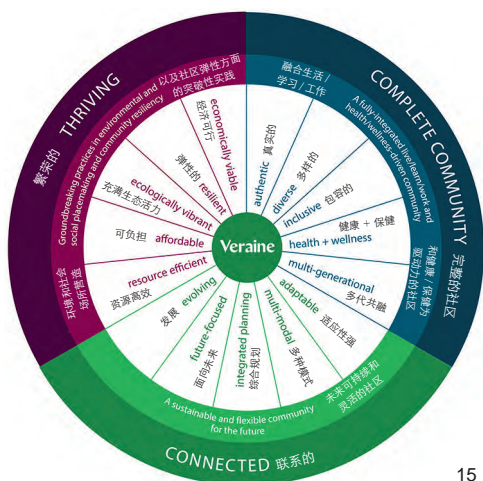
15 维尔雷尼概念规划框架
Veraine concept

16 维尔雷尼概念规划空间布局图
Veraine concept orientation diagram
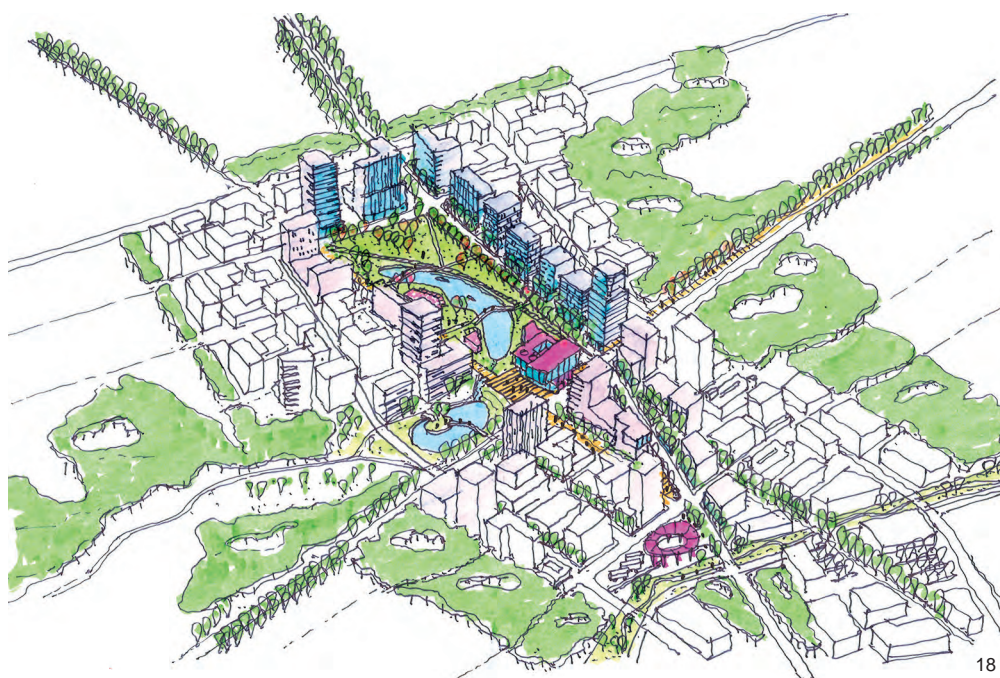
17 维尔雷尼西南角俯视图
Veraine aerial view from south west

units supporting a diverse mix of household types, a waterfront hotel, a 1.6 million square feet Innovation District, 200,000 square feet of retail, a 3-acre urban school site, and 50 acres of parks connecting to a regional green network. It is sited within 1.5 km (accessible along a waterfront pedestrian/bicycle trail) of a major commuter rail station connecting straight into downtown Toronto in 25 minutes. From a land-use and planning point of view, Lakeview Village is significant to the Greater Toronto Area (GTA), and to North American cities in general, through its contribution to progressive GTA goals of increasing density within the urban growth boundary, and for the provision of much-needed housing alongside jobs and close to transit. As such, Lakeview is a template for attainable and desirable densification; leveraging existing infrastructure, improving quality-of-life (through reduced commutes and creation of a strong sense of community), and through environmental factors (synergized site-wide systems, and less reliance on single-occupant automobiles). What makes Lakeview a case study of replicable smart design, however, is its human-scaled, gridded framework of logically-sized blocks, its infusion of green-space throughout the community (the GTA is, with the exception of its ravines, one of the North American cities with the least amount of public green space per capita), and its connectedness to existing urban elements around it. The inclusion of district energy, vacuum waste technology, convert-able parking, extensive day-lighting, and other measures will make Lakeview a smart community, but in the first instance this is enabled by a smart urban design framework.

Veraine[②], in the east, will be a new community in Pickering, at the edge of the urban growth boundary on land that is currently primarily farmed with animal feed crops. This far northeastern corner of the GTA is likely to undergo big changes in the decades to come, through the likely adjacent construction of a second major federal airport for Toronto, and the continued demand for ground-related residential product in the Toronto housing market. Unlike Lakeview, Veraine has a need to be self-contained for a length of time. As such, it is conceived as a bounded community that compactly creates mixed-use and residential districts around an institutional and commercial town center. Veraine, like Lakeview, utilizes a grid structure, but at an entirely different scale. Given the large size of Veraine — 4,000 acres, housing 60,000 residents and 45,000 jobs — and the long duration of its implementation, a lot of consideration was given to future needs, from driverless vehicles to a variety of other technologies. Sasaki felt that a decisive break with the random curvy-ness and intentional disconnectivity (through cul-de-sacs) that characterized late-20th century suburbia was needed. Instead, the opposite is created: maximum connectivity, with numerous nodal points within the community, and walkable and bikeable greenways connecting these throughout. Sasaki rotated the Veraine grid to a "true north" orientation to maximize solar and daylighting benefits, and to create a looseness-of-fit in relation

18 维尔雷尼城镇中心草图
Veraine sketch of town center

19 维尔雷尼雨洪管理示意图
Veraine storm water management
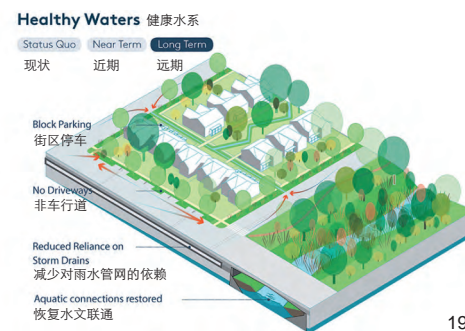
20 维尔雷尼绿篱通道冬景
Veraine hedgerow mobility path

to the existing, larger-module Upper Canada survey grid of the 18th and 19th centuries. The result is a series of anomalous intersections between the two grids, and with natural features, that create relief, open spaces, and identity within the community's grid, while maintaining the potential for the grid of Veraine to be a truly enabling framework for an as-yet unknown future. The current farming uses of the land the community will occupy shed nitrogen fertilizer into local headwaters. Veraine has been engineered to create a ground condition that is considerably better than existing. All runoff will be detained and percolated, with the site essentially being a "sponge". The result will be a large improvement for local streams. From a transportation point of view, bus rapid transit will serve the community in the short-medium term, to be replaced by heavy rail in the long term. Design provision has been made for maximizing both, as well as secondary transport throughout the community, connecting "neighborhood nodes" with transport hubs. As with Lakeview, a large amount of consideration has been given to future conversion or elimination of current parking provisions, as

ride-share and driverless technologies increase. The physical framework of Veraine community lends itself to the inclusion of as-yet-unknown smart technologies, without pre-compromising the community's structure as a place for people.

Intelligent digital networks in cities are of course now essential; their incorporation should be a given, and from there, focus should be on excellence of actual urban placemaking. Designers and the public will have to challenge ourselves to avoid bending the city to the specific demands of technology for technology's sake. Determining what technology to integrate should be carefully considered. We should be asking, can it be reasonably accommodated without degrading the human experience, or what can be leveraged to make a better urban framework? Our history with automobiles shows that this requires vigilance, and a degree of objectivity on the part of city planners and developers to ensure the technology is actually beneficial and not just exciting and profitable.

Sasaki's approach to place-making begins in this spirit. Within our approach, we expect inclusion of smart city elements that improve quality of life and

environmental considerations; vehicles, pedestrians, buildings and their occupants, all communicating; vacuum waste eliminating the need for diesel garbage trucks on local roads; district energy creating synergies and environmental gains, ecological considerations elevated to the fore — these are all now essential things. We design the framework for "unknown unknowns," with the first principle being the making of a great place for people. There is no one size fits all and certainly no recipe. We advance a philosophy and a sensibility that incorporates hive-knowledge and world-experience. Good urban design is a humanist pursuit first, a technical one second.

Notes:
① The client for Lakeview is Lakeview Community Partners Limited (LCPL).
② The client for Veraine is Dorsay Development Corp..

Sources of Figures:
Fig. 1-3, 6, 9, 15-16, 18-19 © Sasaki; Fig. 4-5, 7-8, 10-14, 17, 20 © Cicada.

(Editor / WANG Yilan)