



# BELLEVUE SMART



**Planning for a Smarter City**

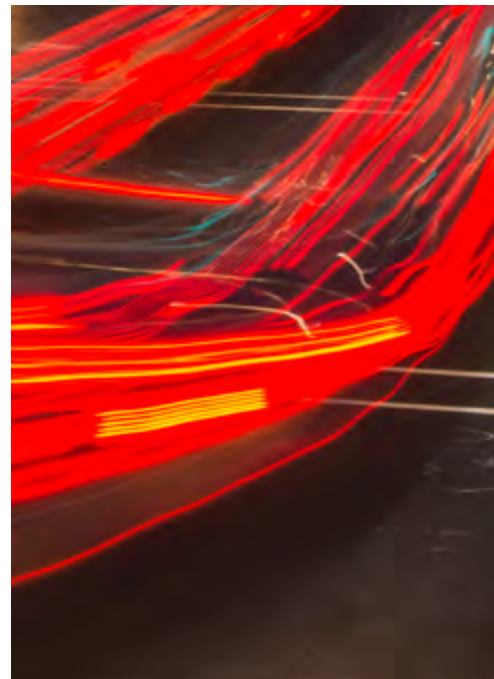
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# Executive Summary

## Executive Summary

Cities, nationally and globally, are embarking on smart city efforts to harness the benefits of rapidly emerging technologies to improve quality of life, increase operational efficiency, enhance economic vitality and improve sustainability. Bellevue particularly benefits from its high tech economy with companies advancing many of these capabilities, residents who take advantage of new technology and a talented workforce that expects its city to effectively benefit from technology. A smart city leverages advances in sensors, devices controllers and instruments that are connected to the internet and to other systems – essentially the Internet of Things (IoT) technologies – to produce data that can be analyzed to inform decisions, improve services and optimize operations. Advances in analytics and machine learning will support the city in moving from reactive to proactive and eventually to predictive operations.

**Bellevue Smart: Planning for a Smarter City** covers smart city strategies and implementation actions to achieve improved livability, sustainability and resiliency in a world that is increasingly digital, mobile, connected and urban. A smart city effort can foster increased innovation, citizen involvement and collaboration with public, private and academic partners in the city and regionally. Further, it contributes to achieving the City Council **Vision** for the community:

*Bellevue is a “smart city” with a clean, high-quality environment and excellent and reliable infrastructure that supports our vibrant and growing city, including high-tech connectivity. The city has a connected multi-modal transportation system, which blends seamlessly with its buildings, plazas and parks.*

As Bellevue becomes a recognized leader in developing and implementing innovative smart city developments, this effort will support the city’s economic development strategies of attracting and retaining technology companies and world-class talent to benefit businesses and residents. Smart technology enhances critical services provided by the city, from traffic management, to water delivery and emergency response to much more. Creating the smart technology portfolio requires more than a single budget cycle to achieve the anticipated benefits. This smart city plan takes a phased, iterative approach to allow the careful planning of major investments, while building in the flexibility to take advantage of opportunities that arise or to adjust tactics because of rapid technology changes.

## DESIRED OUTCOMES

**Desired Outcomes** describe the end results of a smart city effort and the benefits to the community. The plan includes specific details on how to achieve these outcomes, including measurable indicators:

- **Livability:** Smart technologies improve the safety, health, convenience and quality of life for the community, while increasing our economic competitiveness.
- **Sustainability:** The city delivers excellent, long-term services by reducing waste, increasing efficiencies and protecting the environment.
- **Resiliency:** The city is able to respond more effectively to emergencies and recover faster from disruptive events.

## ELEMENTS

Recognizing that smart technologies potentially impact every aspect of city services to promote a high quality of life and economic vitality for Bellevue, this smart city plan matches the **Community and Council Vision** with existing city services and focuses the smart city effort on the following six elements. Each element includes its own set of objectives, strategies and indicators which, over time, will overlap to form a smarter Bellevue.

Where it makes sense strategically and economically, these elements will be integrated to achieve the desired outcomes. For example, transportation and public safety currently rely on interconnected systems to give emergency vehicles signal preemption, with more sophisticated and seamless integration to come. Data integration can also tie various elements together, such as linking water, buildings and energy-use data to enhance conservation efforts.

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|  <b>CONNECTIVITY</b><br><i>Increasing communication network speed, capacity and availability</i><br>Improve consumer services and communications infrastructure, through an emphasis on increasing high-speed communications: <ul style="list-style-type: none"> <li>• Expand Wi-Fi to reduce digital divide</li> <li>• Grow fiber-optic network</li> <li>• Increase high-speed broadband availability</li> <li>• Integrate smart city networks to increase efficiencies and monitor emerging capabilities</li> <li>• Provide improved citizen-information access</li> </ul> |  <b>TRANSPORTATION</b><br><i>Moving people smarter, safer and faster, while providing more choices, better real-time information, lowering emissions and raising efficiencies</i><br>Improve ways for people to move around the city: <ul style="list-style-type: none"> <li>• Enhance adaptive traffic signal operations</li> <li>• Improve traveler information</li> <li>• Integrate multi-modal travel options to improve mobility</li> <li>• Advance Vision Zero to provide safer mobility for vehicles, pedestrians and bike riders</li> </ul> |  <b>PUBLIC SAFETY</b><br><i>Reducing response time, increasing survival rate, reducing crime rate, increasing emergency capabilities</i><br>Further integrate infrastructure, services, agencies, and personnel that cities call on to keep people safe: <ul style="list-style-type: none"> <li>• Improve 911 services</li> <li>• Enhance communications networks for greater interoperability and backup</li> <li>• Increase incident situational awareness for effective response</li> <li>• Enhance data-driven policing practices</li> <li>• Improve hazmat awareness and mitigation</li> </ul> |
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|  <b>WATER</b><br><i>Delivering high-quality and reliable water, protecting critical infrastructure, conserving resources</i><br><p>Ensure high-quality delivery of water services to homes and businesses to minimize disruptions and increase customer service:</p> <ul style="list-style-type: none"> <li>• Integrated asset management to improve efficiencies</li> <li>• Smart system operations</li> <li>• Advanced metering allows frequent readings, leak detection and increases customer awareness of options</li> </ul> |  <b>BUILDINGS</b><br><i>Optimizing building performance, decreasing wasted energy and water, increasing comfort and safety</i><br><p>Enhance building systems and analytics to improve building systems performance and resource conservation and efficiencies:</p> <ul style="list-style-type: none"> <li>• Building energy data benchmarked to influence conservation/resource savings</li> <li>• Building water data benchmarked to influence conservation/resource savings</li> </ul> |  <b>ENERGY</b><br><i>Improving grid reliability, increasing efficiency, connecting renewables</i><br><p>Improve and integrate energy systems to ensure sufficient, efficient and reliable energy that power all systems our modern digital society requires:</p> <ul style="list-style-type: none"> <li>• Implement smart grid system operations for increased reliability</li> <li>• Energy conservation and efficiency and increase in renewables</li> <li>• Two-way automated metering increases communication with energy partners like PSE</li> </ul> |
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## PRINCIPAL STRATEGIES

The smart city plan is centered on four **Principal Strategies** that apply across all the elements. All elements deploy these common strategies, albeit with appropriate variations.

**Focus on proactive and adaptive.** A smart city shifts from reactive mode, responding when a problem is reported, to a proactive, even predictive, mode able to anticipate and adapt in real-time to changing conditions. In order to be proactive and adaptive, systems must be integrated and interoperable to achieve the greatest benefits in safety, service and convenience. Systems also need to be designed for high levels of reliability and resiliency because of the low tolerance for disruption and cascading impacts if critical systems do not function properly.

**Drive with data.** The proliferation of smart devices like controllers, sensors, devices and vehicles connected to the internet, produce enormous amounts of data that enable a smart city to improve operations, services and infrastructure. Embedded machine learning and artificial intelligence can also enhance automation and drive efficiencies of systems and enhance staff productivity. Increasing competency by using data effectively to drive decision making is necessary. Without this increase in competency, the volume and velocity of data streaming from smart systems will overwhelm the city's ability to turn data into meaningful and useful information.

**Pursue partnerships.** The impact of IoT on city infrastructure systems, community homes and buildings, vehicles on city roads and real-time information expectations is challenging the city's normal, forward-thinking approach to technology adoption. Fortunately, this high-tech region, with an abundance of technology innovators, opens up partnership opportunities to help shape industries,

services and technologies that can keep Bellevue in the forefront of innovation. The city already sustains an entrepreneurial and talented workforce with many innovative startups. This community influences how the city pursues technology to meet service expectations and fulfill the Community Vision. Bellevue has been and will continue to be a testbed for pilot projects.

**Leverage regional relationships.** Ultimate goals, like clean water and a safe community, require relationships and interactions that extend well beyond Bellevue's boundaries. Crime and congestion does not stop at the city's borders, and regional solutions should be leveraged. Bellevue has a solid history of being a regional collaborator. The city provides services to other cities, like water utilities; receives services from other organizations, such as NORCOM for 911 service; and relies on mutual aid agreements with other agencies in the case of fire services. Systems like roads, water, energy and fiber-optic networks also cross city boundaries. Existing regional organizations, professional associations and projects offer great forums to continue advancing smart city objectives, and many of these share similar interests in building smarter communities.

## LONG-RANGE STRATEGY

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### → 1. FOCUS ON PROACTIVE AND ADAPTIVE SOLUTIONS (OR SYSTEMS)

Provide proactive and adaptive urban systems that create interoperable systems for the highest levels of performance, optimal customer experience and resiliency from major disruptions.

#### Connectivity

- Continue expanding fiber-optics network in the city and throughout the region to future-proof infrastructure for smart city networks and increase resiliency.

#### Transportation

- Leverage the upcoming ITS Master Plan update to define the next set of advanced capabilities – performance monitoring, data and information sharing, smart streetlights, parking management, multi-modal integration – to advance Bellevue's transportation system into proactive mode and ready the system for autonomous and connected vehicles.

#### Public safety

- Support regional and national efforts to upgrade public safety communications systems with an enhanced radio network and a dedicated public safety wireless network to improve interoperability.
- Monitor grant opportunities for next-generation first responders' technologies.
- Further optimize response times by integrating traffic signal prioritization with emergency vehicles.
- Pilot new air quality monitoring technologies as part of re-planning processes in select areas of the city.
- Monitor developing smart building technology, understanding that the city will need to be able to communicate with a variety of systems and seek opportunities for data standardization.

**Water**

- Upgrade the Supervisory Control and Data Acquisition (SCADA) system to replace aging technology for greater system-wide reliability while improving data collection and analysis capabilities.
- Implement Advanced Metering Infrastructure (AMI) for improved customer service, real-time usage tracking and proactive leak detection.
- Integrate technology systems – customer information, assets, GIS, etc. – for increased analytics, efficiencies and operational response.

**Energy**

- Foster opportunities for micro-grid and district energy pilots to enhance energy resiliency.
- Expand electric vehicle charging stations to support clean transportation goals.

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**→ 2. DRIVE WITH DATA**

Turn the enormous volume of data coming from smart city systems into useful information to optimize systems and drive decision making to achieve the desired outcomes of the smart city plan.

**Transportation**

- Implement enhanced pedestrian and bike operations monitoring and analytics to support multi-national Vision Zero initiative to end traffic fatalities.

**Public safety: Police**

- Enhance data-driven policing to improve efficacy and increase the community's sense of safety.

**Buildings**

- Collect data on smart building technology adoption in Bellevue businesses and provide building performance data to the community to influence behavior and decision making.

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**→ 3. PURSUE PARTNERSHIPS**

Foster public-private partnerships that are advantageous to deploying emerging technologies, align with the city's interests, mission and objectives and allow Bellevue to continue being a technology leader and innovator.

**Connectivity**

- Partner with private sector service providers to continue enhancing and expanding services in Bellevue.
- Expand Wi-Fi amenities to enhance gathering places and expand options for connecting to the internet, especially for low-income students and seniors.
- Establish partnerships with other local jurisdictions and education institutions for enhanced regional data sharing and analysis.

### Transportation

- Use public and private partnership pilots to improve the transportation system's reliability, mobility and safety while supporting the development of new technologies. The specific focus will be on connected- and autonomous-vehicles technology, first/last mile travel solutions and data sharing with companies building relevant travel applications.
- Coordinate with Puget Sound Energy (PSE) to pilot and deploy a streetlight management system.
- Leverage existing third-party traveler information providers and app services to share Bellevue traffic data and disseminate more accurate construction and incident information.
- Pursue transportation technology partnerships for ride sharing and electric vehicle charging.

### Buildings

- Expand on partnerships with PSE and others to increase smart buildings and energy savings through programs like Urban Smart Bellevue.
- Develop performance-based pilots and policies to grow the stock of advanced green buildings.

### Energy

- Continue programs to expand renewable energy and develop policies and targets on fossil-fuel-free energy.
- Continue PSE collaboration on electrical reliability and piloting smart grid technologies in Bellevue.

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## → 4. LEVERAGING REGIONAL RELATIONSHIPS

Advance smart city interests through regional relationships and cultivate a shared vision for smarter communities throughout the region.

### Connectivity

- Continue seeking opportunities to connect schools, hospitals and government facilities to ensure they have the high speed connectivity to serve our residents effectively well into the future, including increasing resiliency for communications networks that form the foundation for all smart systems
- Expand public Wi-Fi to low-income housing property to expand options for connecting to the internet for low-income students and seniors in partnership with King County Housing Authority and Bellevue School District. Also expand Wi-Fi to select business corridors and parks to enhance amenities at gathering places throughout the community.

### Transportation

- Continue leadership on regional transit projects impacting the Eastside to achieve multimodal objectives and first/last mile connectivity.
- Identify emerging technologies that could benefit from partnering with Sound Transit through the ST3 "Innovation and Technology Program" aimed at improving ridership, transit service and regional mobility.

## Public safety

- Continue to partner with public safety agencies in the region to improve information accuracy, response times and effectiveness.

## PERFORMANCE MEASURES

The city uses performance management to monitor effectiveness and efficiency of city services. The following measures and indicators track progress on accomplishing the objectives within each element. In some instances, measures signify the city's direct impact on objectives, such as traffic collision measures related to safety goals. Other indicators more loosely gauge the city's ability to influence or facilitate more wide-ranging outcomes, such as broadband adoption rate and availability of competition for consumer internet services that can also be shaped by other factors. Measures are continually re-evaluated as new systems bring advancements and additional data that can be used to improve measures.

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|  <b>CONNECTIVITY</b> <ul style="list-style-type: none"> <li>• Broadband adoption rate indicating availability of competition for consumer services</li> <li>• Smartphone ownership rate as indicator of increasing connectivity demand</li> <li>• Free-access Wi-Fi access points within the community</li> </ul> |  <b>TRANSPORTATION</b> <ul style="list-style-type: none"> <li>• Number of fatal and serious injury collisions to quantify road safety and attainment of Vision Zero goals</li> <li>• Miles of designated bike paths/lanes, supporting availability of multimodal transportation choices</li> <li>• Single-occupant vehicle rate reflecting effectiveness of transportation choices</li> </ul> |  <b>PUBLIC SAFETY</b> <ul style="list-style-type: none"> <li>• Patrol response time to life-threatening emergencies</li> <li>• Violent crimes and property crimes rate as a measure of community safety</li> <li>• Percentage of fire response time in six minutes or less, from call to arrival</li> <li>• Cardiac arrest survival rate as an effectiveness measure of emergency medical services</li> </ul> |
|  <b>WATER</b> <ul style="list-style-type: none"> <li>• Regulatory compliance monitoring drinking water quality</li> <li>• Unplanned water service interruptions avoided due to leak detection</li> <li>• Wastewater overflows mitigated due to SCADA warnings</li> </ul>                                        |  <b>BUILDINGS</b> <ul style="list-style-type: none"> <li>• Number of Energy Star-rated buildings in Bellevue as indicator of smart building efficiencies in the community</li> <li>• Median energy use for municipal buildings achieved through the adoption of smart building systems/practices</li> </ul>                                                                                 |  <b>ENERGY</b> <ul style="list-style-type: none"> <li>• Residential, commercial, industrial energy, as indicators of efficiencies from conservation practices and systems, such as advanced metering</li> <li>• Frequency of electrical service interruptions</li> <li>• Duration of interruptions to monitor impacts to customers</li> </ul>                                                               |

## LOOKING FORWARD

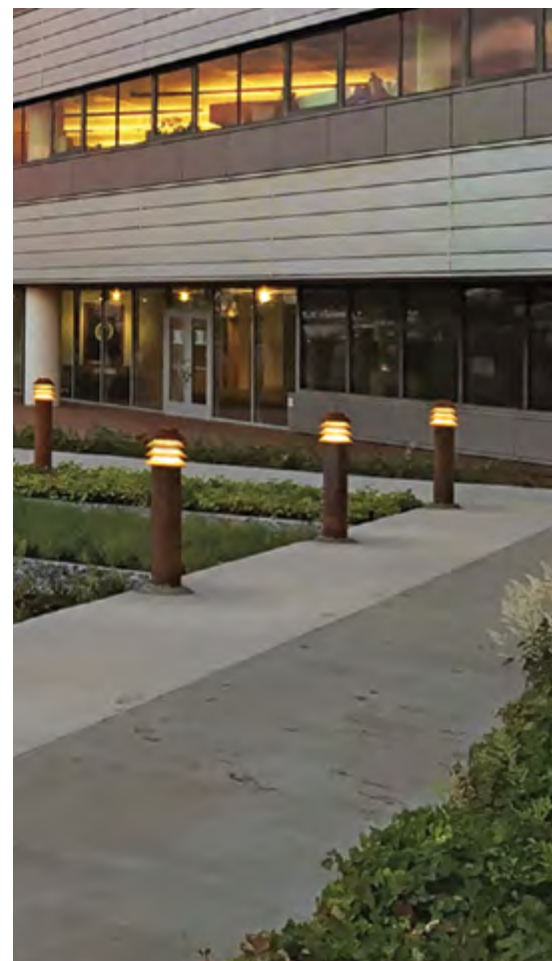
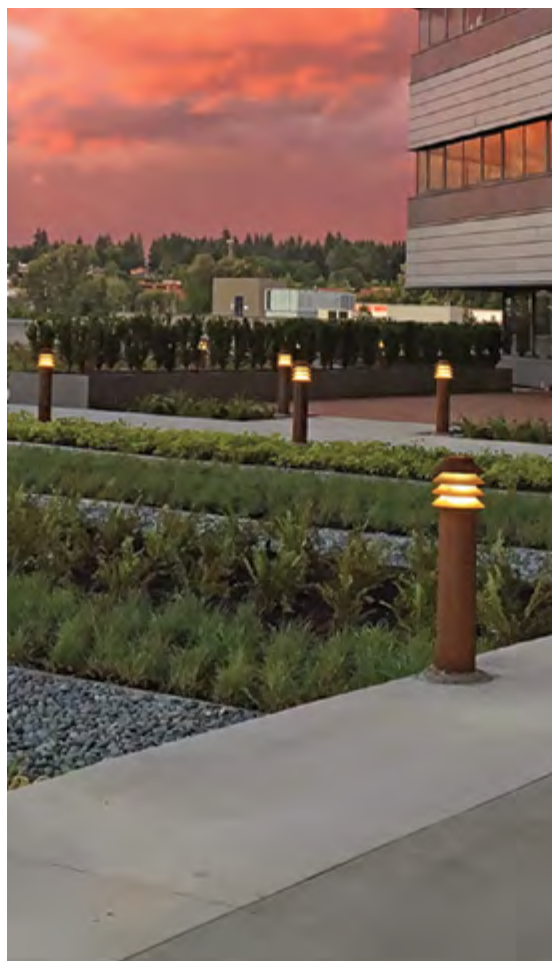
The smart city plan is a phased, iterative approach to achieving the community and Council's longer term goals of becoming a smarter city. This approach allows enough structure to plan for major projects while remaining nimble enough to take advantage of opportunities that arise; accelerating to achieve objectives more quickly or adjusting to a rapidly changing landscape.

While the following three general phases comprise this longer-range plan, there will logically be times where a system or project matures and crosses over into another phase. Major investments like the Advanced Metering Infrastructure project and traffic signal integration discussed in Phase 1, will move into integrated and interoperable capacity in later phases.

- Phase 1-Investing in Foundational Systems
- Phase 2- Integrating for Efficiencies
- Phase 3-Achieving Proactive, Adaptive and Interoperable Capabilities

This plan brings together a focused vision, clear strategies to achieve that vision, defined objectives for each element and ways to monitor progress. The smart city plan drives Bellevue further down the smart continuum and, in the process, nurtures an environment, an “ecosystem,” for innovation and improvement for the long-term benefit of the community.





**Background**



*A smart city uses IoT, data and connectivity to improve city services and systems to make a city more livable, sustainable and resilient.*

## Background

**OBJECTIVE: Creating a community that is future ready, connected and enduring for all.**

### PLANNING PROCESS

A smart city vision figured prominently in the City Council's *Bellevue 2035 – The City Where You Want to Be* supporting the Council and Community goal of creating a High Quality Built Environment. The council also established a path to realizing this longer-term goal by focusing priorities within the two-year budget cycle. In 2014, the priority to **develop the Smart City strategy to include high-speed data options to support business and residents and determine implementation steps** set this plan in motion.

### ALIGNING VISION WITH EFFORT

To achieve the council vision, the initial focus was to evaluate emerging and innovative technologies to gain a clearer picture of what “smart city” could be and to discover the potential for these technologies to best address Bellevue’s needs. Bellevue’s smart city approach also tailors focus areas to the priorities articulated in the community vision as captured in the Comprehensive Plan.

Six elements were identified that best align with the community and council vision. These elements provide a structure that focuses efforts, clarifies objectives and helps organize strategies. The scope of the elements are defined below and cross-walked to established vision statements.

| Smart city element                                                                                                                                                                                                                                    | Vision statement                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| <p><b>CONNECTIVITY</b></p> <p>Broadband internet, Wi-Fi and other connectivity services direct to the consumer and enabling communications infrastructure with an emphasis on high-speed communications.</p>                                          | <p><b>Community:</b> <i>Bellevue is a hub for global business and innovation.</i></p> <p><b>Council</b></p> <ul style="list-style-type: none"> <li>• Bellevue is a “smart city” with a clean, high-quality environment and excellent and reliable infrastructure that supports our vibrant and growing city, including high-tech connectivity</li> <li>• Our institutes of higher learning are connected physically and digitally.</li> </ul>                                                                          |
| <p><b>TRANSPORTATION</b></p> <p>All systems that move people around the city. This includes networks of streets, rails, buses, bike paths, sidewalks, traffic signals and safety systems that ensure safety on these networks, including signage.</p> | <p><b>Community:</b> <i>Moving into, around and through Bellevue is reliable and predictable.</i></p> <p><b>Council</b></p> <ul style="list-style-type: none"> <li>• Providing a highly-functioning transportation system</li> <li>• The city has a connected multi-modal transportation system, which blends seamlessly with its buildings, plazas and parks.</li> <li>• A state-of-the-art, intelligent transportation system moves people through the city with a minimum of wait times and frustration.</li> </ul> |
| <p><b>PUBLIC SAFETY</b></p> <p>All the infrastructure, services, agencies and personnel that cities call on to keep people safe, including police and fire departments, emergency medical services, and disaster preparedness and prevention.</p>     | <p><b>Community:</b> <i>Bellevue is a community that cares.</i></p> <p><b>Council</b></p> <ul style="list-style-type: none"> <li>• Our residents live in a safe, clean city that promotes healthy living. The perception of safety contributes to the success of businesses and neighborhoods. Police, fire, and emergency personnel are seen by citizens every day and we ensure that these services reflect high standards and pride.</li> </ul>                                                                     |
| <p><b>WATER</b></p> <p>Systems that deliver high-quality water to homes and businesses and appropriately handle waste and storm water.</p>                                                                                                            | <p><b>Community:</b> <i>Bellevue has the public and private utilities that meet the needs of a growing economy.</i></p> <p><b>Council</b></p> <ul style="list-style-type: none"> <li>• Infrastructure is ample and in excellent condition, including roads, rails, high-speed data, reliable electricity and clean water.</li> <li>• We have superb infrastructure to support growing businesses and desirable residential opportunities.</li> </ul>                                                                   |

|                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>BUILDINGS</b></p> <p>Intelligent building systems and analytics that improve quality of life and sustainability while providing significant cost savings.</p>        | <p><b>Community:</b> <i>Bellevue embraces its stewardship of the environment by protecting and retaining natural systems, and building for a sustainable future.</i></p> <p><b>Council</b></p> <ul style="list-style-type: none"> <li>Bellevue has it all. From a livable high-rise urban environment to large wooded lots in an equestrian setting, people can find exactly where they want to live and work in Bellevue. The diverse and well-balanced mix of business and commercial properties and a wide variety of housing types attract workers and families who desire a safe, sustainable and accessible community.</li> </ul> |
| <p><b>ENERGY</b></p> <p>Energy powers all the technology used in a smart city. Intelligent systems ensure sufficient, efficient and reliable energy for the community.</p> | <p><b>Community:</b> <i>Bellevue has the public and private utilities that meet the needs of a growing economy.</i></p> <p><b>Council</b></p> <ul style="list-style-type: none"> <li>Infrastructure is ample and in excellent condition, including roads, rails, high-speed data, reliable electricity and clean water.</li> </ul>                                                                                                                                                                                                                                                                                                      |

## ESTABLISHING HIGH-LEVEL OBJECTIVES

After defining the six elements, high-level objectives outlining what should be achieved through the smart city plan implementation were developed.

| Element               | Objectives                                                                                                                                       |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CONNECTIVITY</b>   | Increasing communication network speed, capacity and availability                                                                                |
| <b>TRANSPORTATION</b> | Moving people smarter, safer and faster, while providing more choices, better real-time information, lowering emissions and raising efficiencies |
| <b>PUBLIC SAFETY</b>  | Reducing response time, increasing survival rate, reducing crime rate, increasing sense of safety                                                |
| <b>WATER</b>          | Delivering high quality and reliable water, protecting critical infrastructure, conserving resources                                             |
| <b>BUILDINGS</b>      | Optimizing building performance, decreasing wasted energy and water, increasing comfort and safety                                               |
| <b>ENERGY</b>         | Improving grid reliability, increasing efficiency, connecting renewables                                                                         |

## BENCHMARKING BELLEVUE: SMART CITY MATURITY ASSESSMENT AND GAP ANALYSIS

In order to define strategies for each smart city element, it was important to start by asking: “How smart is the city right now?” By understanding the current state, a more informed approach for each element could be tailored to address its distinct needs and achieve the overall objectives. A maturity assessment tool was developed to define gaps and shape strategies. Maturity levels were defined from basic services at the Ad-hoc level 1 to the highest capabilities of Optimized level 5. At the highest level, services and systems are proactive, real-time adaptive, resilient and interoperable, establishing an ideal long-term, end-state for each element.

The overall maturity assessment results are below, with solid filled boxes representing where Bellevue is today. Aspirations for the next three to five years are represented by hashed arrows. The intent is to pragmatically move towards the managed and optimized states to achieve increasing capabilities.

These levels and gaps guided the development of strategies, including budget proposals and other funding possibilities. Elements were broken down into corresponding sub-elements, with details provided in each element chapter.

| Maturity Index        | 1      | 2             | 3          | 4       | 5         |
|-----------------------|--------|---------------|------------|---------|-----------|
| Standard Scale        | Ad-hoc | Opportunistic | Repeatable | Managed | Optimized |
| <b>CONNECTIVITY</b>   |        |               |            |         |           |
| <b>TRANSPORTATION</b> |        |               |            |         |           |
| <b>PUBLIC SAFETY</b>  |        |               |            |         |           |
| <b>WATER</b>          |        |               |            |         |           |
| <b>BUILDINGS</b>      |        |               |            |         |           |
| <b>ENERGY</b>         |        |               |            |         |           |

## SMART CITY PORTFOLIO

Addressing the smart city gaps identified through the maturity assessment requires an orchestrated strategy of both near-term and long-range future focused investments. To achieve success, efforts emphasized the following attributes:

- Delivering customer benefits
- Promoting interoperability of different technology systems
- Leveraging technology investments already made and technologies that benefit multiple elements

- Maximizing resources through a flexible approach that takes advantage of grant opportunities, public-private partnerships, regional partnerships and other funding opportunities
- Reducing risk through careful project timing based on technology maturity and industry readiness

The table highlights where Bellevue's smart city investments are included in the 2017-2018 Budget:

| Council Priority                                                                                         | Operating or CIP              | Existing investment                                                                                                                                                                                                                                                                                                                                                                                                                                       | New investment                                                                                                                                                                                                                                                |
|----------------------------------------------------------------------------------------------------------|-------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bring a "smart city" strategy to the Council for its consideration for inclusion in the 2017/2018 budget | <b>OPERATING</b><br>(2017-18) | <ul style="list-style-type: none"> <li>• 090.08NA Network Services and Security (\$570K out of total \$5.7M)</li> <li>• 130.11NA Intelligent Transportation Systems (ITS) (\$1.5M)</li> <li>• 130.24NA Signal Operations and Engineering (\$955K)</li> <li>• 140.25NA Utilities Telemetry and Security Systems (\$1.5M)</li> </ul>                                                                                                                        | <ul style="list-style-type: none"> <li>• 070.31NA Electronic Records for Patient Care (\$76K out of total \$124K)</li> <li>• 130.500NA Telecommunications and Franchise Advisor (\$291K)</li> <li>• Transportation Technology Partnership (\$300K)</li> </ul> |
|                                                                                                          | <b>CIP</b><br>(to 2023)       | <ul style="list-style-type: none"> <li>• G-93 Community Network Connectivity (\$400K out of total \$500K)</li> <li>• PW-M-20 Minor Capitol – Signals and Lighting (\$1.4K out of total \$2.9M)</li> <li>• PW-R-156 ITS Master Plan Implementation Program (\$2.85M out of total \$3.17M)</li> <li>• G-38 Expanded Community Connectivity (\$1M out of total \$1.3M)</li> <li>• CD-37 Downtown Community Implementation (\$155K out of \$4.15M)</li> </ul> | <ul style="list-style-type: none"> <li>• 140.69A Advanced Meter Infrastructure Implementation (\$23.1M)</li> <li>• Neighborhood Levy for Transportation Technology (\$3.5M)</li> </ul>                                                                        |

**Other funding sources:** Research surfaced additional funding opportunities include grants, public private-partnerships, competition prizes and revolving loan programs. Areas being actively monitored include grants from the National Institute of Standards Technology/Global Cities Team Challenge, Department of Energy and the National Science Foundation. Current public/private partnerships include various PSE initiatives as well as the development of a transportation role specifically tasked with discovering new opportunities, competing for prizes like the Georgetown University Energy Prize and exploring loan programs like King County's revolving loan options.

## PERFORMANCE MEASURES

Bellevue's progress toward the **Desired Outcomes** can be tracked using community indicators and performance measures as described below. The city will track and report on these measures through the city's performance dashboard and through updates of this plan. Additional measures are detailed under each element.

| Desired outcome | Measures                                                     | 2016 Current state                              |
|-----------------|--------------------------------------------------------------|-------------------------------------------------|
| LIVABILITY      | <b>CONNECTIVITY</b>                                          |                                                 |
|                 | • Broadband adoption rate <sup>1</sup>                       | <b>88%</b> Higher is better                     |
|                 | • Smartphone ownership rate <sup>2</sup>                     | <b>81%</b>                                      |
|                 | <b>WATER</b>                                                 |                                                 |
|                 | • Compliance with state and federal regulations <sup>3</sup> | <b>100%</b>                                     |
|                 | <b>TRANSPORTATION</b>                                        |                                                 |
|                 | • Single-occupant vehicle rate <sup>4</sup>                  | <b>62%</b> Lower is better                      |
| SUSTAINABILITY  | • Miles of designated bike paths/lanes <sup>5</sup>          | <b>42</b>                                       |
|                 | <b>BUILDINGS</b>                                             |                                                 |
|                 | Number of Energy Star-rated buildings <sup>6</sup>           | <b>70</b> Higher is better                      |
|                 | Median energy use for 27 municipal buildings <sup>7</sup>    | <b>65.5 kBtu/square foot</b><br>Lower is better |
|                 | <b>ENERGY</b>                                                |                                                 |
|                 | • ELECTRICITY <sup>8</sup>                                   | <b>520.5M kWh</b> Lower is better               |
|                 | • Total residential use                                      |                                                 |
|                 | • Total residential use                                      | <b>22.5M kWh</b> Lower is better                |
|                 | • Total residential use                                      | <b>1,045.4M kWh</b> Lower is better             |
|                 | • NATURAL GAS <sup>9</sup>                                   |                                                 |
|                 | • Total residential use                                      | <b>27M therms</b> Lower is better               |
|                 | • Total residential use                                      |                                                 |
|                 | • Total residential use                                      | <b>15.3M therms</b> Lower is better             |
|                 | PSE renewable electricity source percentage <sup>10</sup>    | <b>9%</b> Higher is better                      |

| Desired outcome | Measures                                                                                    | 2016 Current state                |
|-----------------|---------------------------------------------------------------------------------------------|-----------------------------------|
| RESILIENCY      | <b>ENERGY</b>                                                                               |                                   |
|                 | Frequency of electrical service interruptions <sup>11</sup>                                 |                                   |
|                 | Duration of electrical service interruptions <sup>12</sup>                                  | <b>186.9 min.</b> Lower is better |
|                 | <b>PUBLIC SAFETY: POLICE AND FIRE</b>                                                       |                                   |
|                 | Violent crimes and property crimes rate per 1,100 residents                                 | <b>8.25</b> Lower is better       |
|                 | Cardiac arrest survival rate <sup>13</sup>                                                  | <b>58%</b> Higher is better       |
|                 | Percentage of fire response time in six minutes or less, from call to arrival <sup>14</sup> | <b>64.25%</b> Higher is better    |
|                 | <b>TRANSPORTATION</b>                                                                       |                                   |
|                 | Serious injury collisions and related fatalities <sup>15</sup>                              | <b>24</b> Lower is better         |
|                 | <b>WATER</b>                                                                                |                                   |
|                 | Unplanned water service interruptions per 1,000 customers <sup>16</sup>                     | <b>0.64</b> Lower is better       |
|                 | Wastewater overflows per 1,000 customer accounts caused by system failures <sup>17</sup>    | <b>0.135</b> Lower is better      |

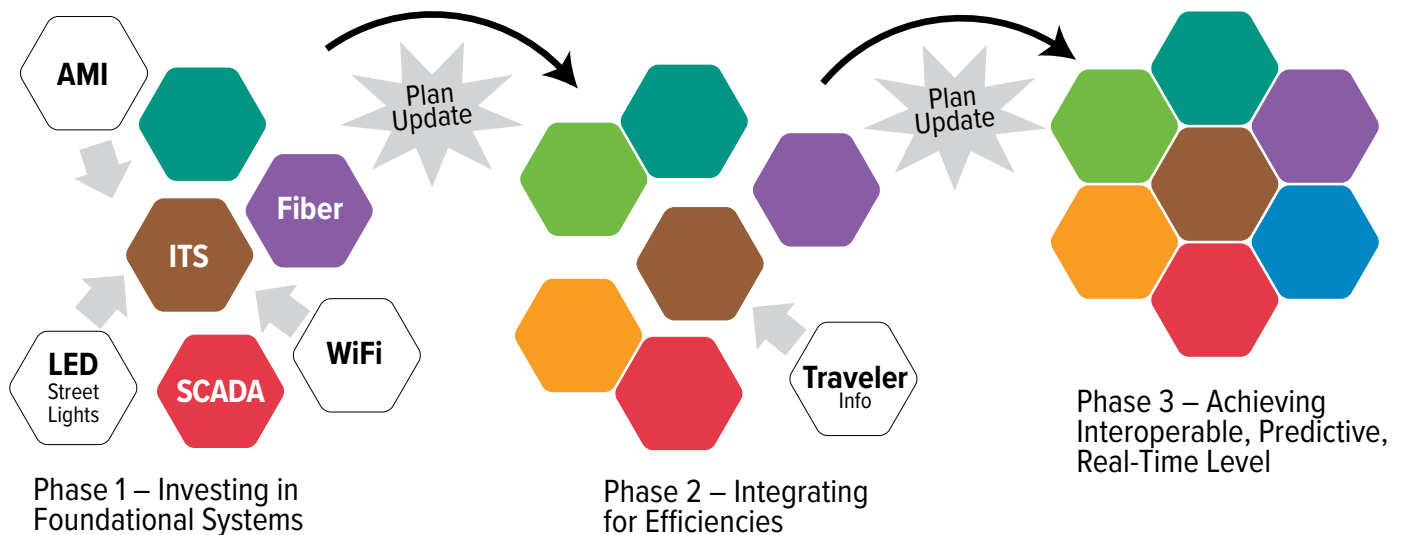


## FUTURE-FOCUSED APPROACH

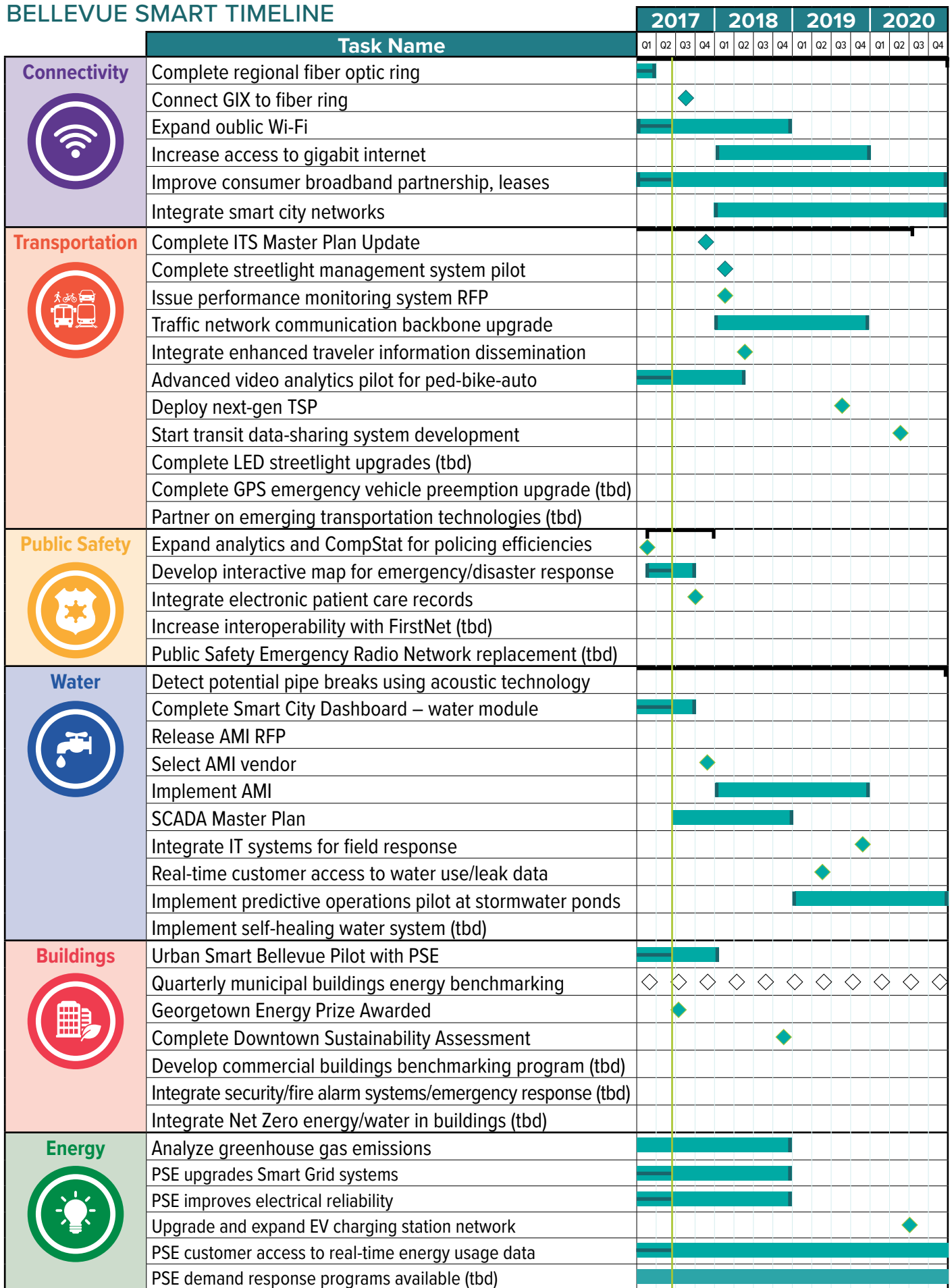
Due to the complexity of integrating systems and adopting emerging technologies, becoming a smarter city will take longer than a year or a single budget cycle, and must be done in a phased iterative approach that allows for planning of major projects while building in enough flexibility to take advantage of opportunities that arise or adjust tactics based on rapid changes. At least three phases are envisioned in the **Bellevue Smart: Planning for a Smarter City**:

1. Phase 1 – Investing in Foundational Systems
2. Phase 2 – Integrating for Efficiencies
3. Phase 3 – Achieving Proactive, Real-time Adaptive, Resilient and Interoperable Capabilities

This smart city plan focuses on Phase 1, where major investments are being made in critical systems and plans, such as Advanced Metering, the Intelligent Transportation System Master Plan Update and others. Some system and data integration efforts are already underway for increased levels of service. Phase 2 of this plan will build on those efforts. During Phase 3, the city achieves hoped-for levels of services and system capabilities, but can accelerate tactics depending on emerging capabilities and partnership opportunities that might arise.



## BELLEVUE SMART TIMELINE





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# BELLEVUE SMART