ModelCity

Leveraging the Power of Kelowna's Digital Twin

February 24, 2020

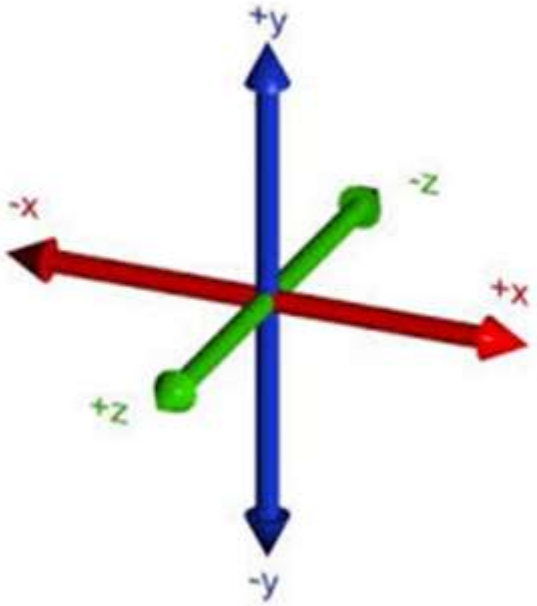
Why ModelCity

- Prior to ModelCity, it was very difficult to answer questions about the composition of the city
- Goal of being more innovative, accountable and productive
- Leverage data to drive evidence-based decisions


267 housing units
~370 people

What is ModelCity

- ModelCity is a parcel-based, digital twin, that was built to better understand the city, both now and into the future.
- By leveraging the power of ArcGIS, data analytics and predictive modelling, we have a unique ability to understand Kelowna.



How ModelCity Works

- City is a repository of data:
  - Utility
  - Business License
  - Assessments
  - Building Permits
  - Development Apps
  - Etc…

- Much of the data is disconnected based on data ownership

ModelCity Purpose

- Created a system that integrates disconnected data to drive stronger evidence-based decisions.
- Allows us to answer three main questions; what does Kelowna look
  - Today
  - Tomorrow
  - Future

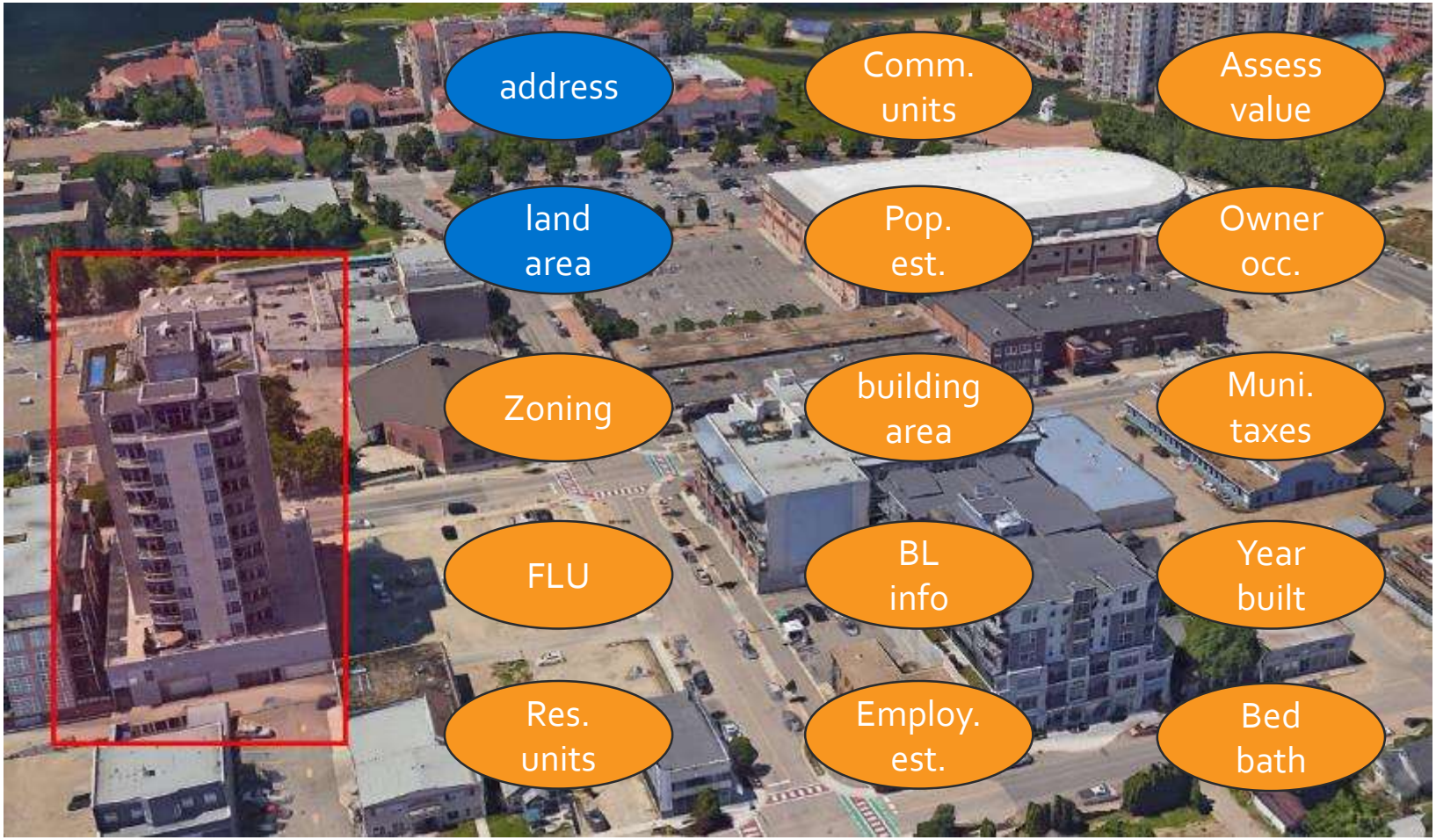
ModelCity System

- ***ModelCity Now – Kelowna today***
- ModelCity Next – Kelowna tomorrow
- ModelCity Future – Kelowna in the future?

ModelCity Now

- First piece of the system
- Parcel based "real-time" digital twin
- Comprehensive picture of Kelowna today
- Allows for a level of understanding and analysis that we did not previously have access to

ModelCity Now Example

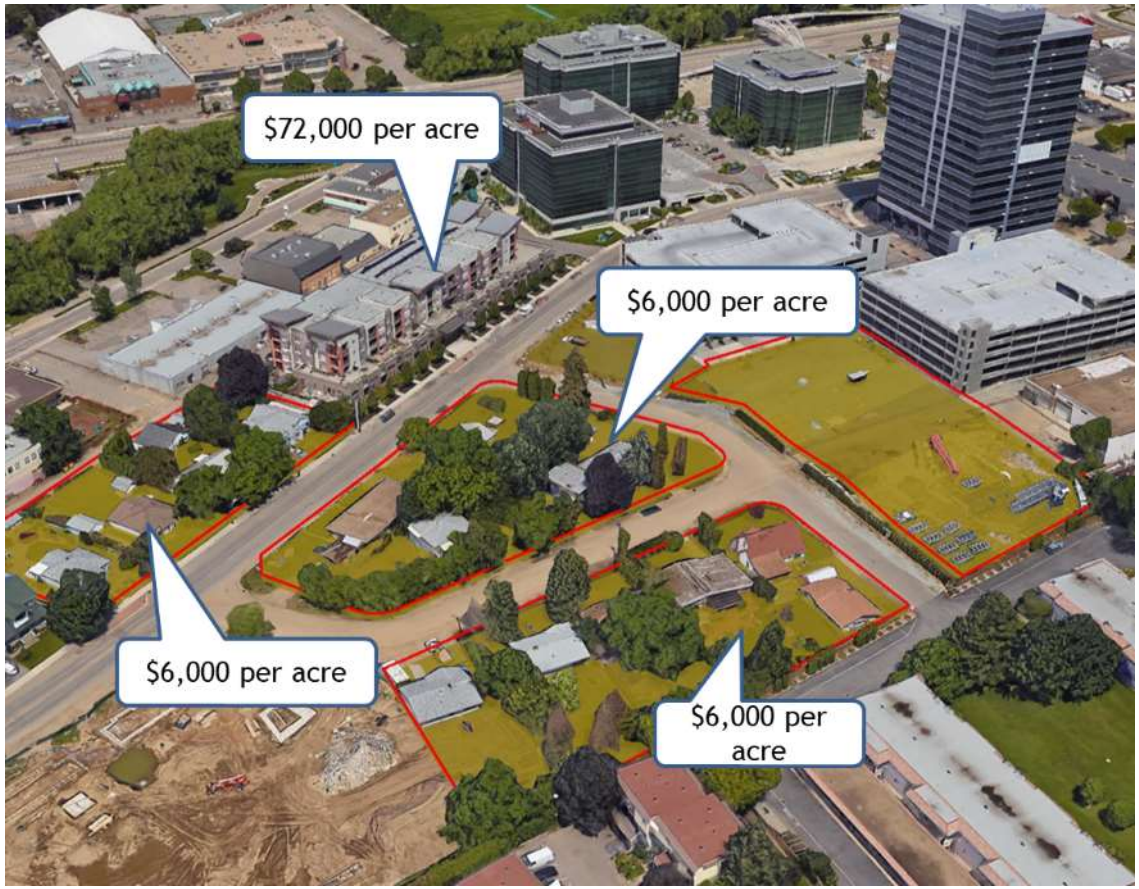


Actual_Use_Classes	RESIDENTIAL
Actual_Use_Description	Strata-Lot Residence (Condominium)
Planning_Classes	
Property_Memo	
Nbr_of_res_units	45
Nbr_of_com_units	2
Nbr_of_ind_units	0
Nbr_of_inst_units	0
Nbr_of_other_units	0
Total_StrataUnitArea_sqf	57198
Total_Strata_Res_UnitArea_sqf	55552
Total_Strata_Comm_UnitArea_sqf	1646
Oldest_Building_Year	2006
Newest_Building_Year	2006
Total_Gross_Land	$11,508,300.00
Total_Gross_Building	$15,064,000.00
Total_Gross_Values	$26,572,300.00
Home_Owner_Grant	Y67%
BL_Numbers	Number of Bussiness: 3
BL_Type_Codes	9000
BL_Description	Online Trading
BL_Employees	1
BL_Vehicles	0
BL_Area_Sqf	0
Zoning_Codes	C7
FutureLandUse_Codes	MXR
Res_House_Total_Area	04
Res_House_Stories	1
Res_House_Bedrooms	74
Res_House_Bathrooms	94
Total_Building_Area_sqf	57198
T_Pop	51
San	Y
SFE	32.83308

City of Kelowna

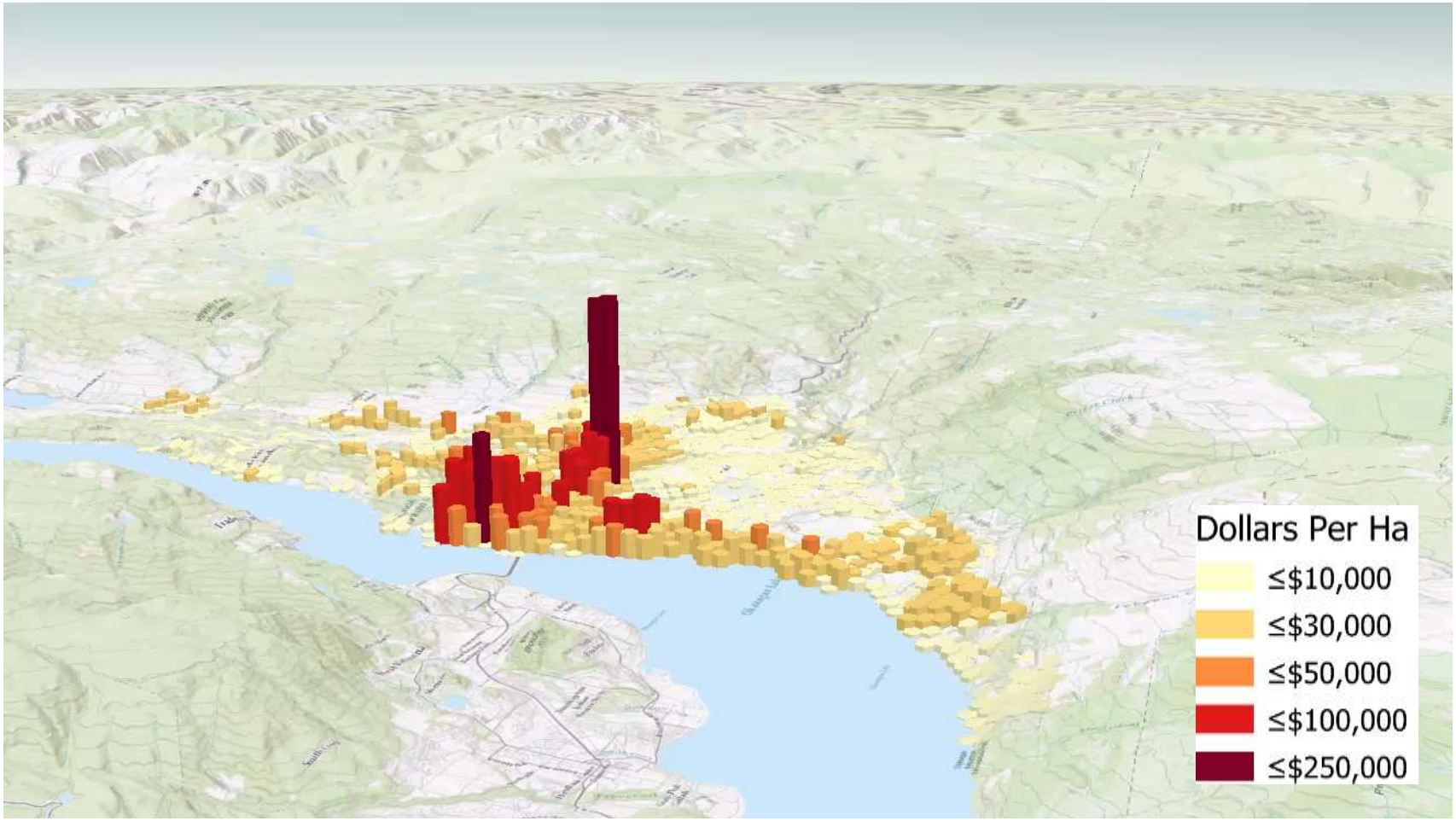
ModelCity Now Scalability

- Developed for maximum flexibility and scalability
- Analyze at parcel, neighborhood or city level



Municipal tax revenue per Acre

ModelCity Scalability



ModelCity System

- ModelCity Now – Kelowna today
- ***ModelCity Next – Kelowna tomorrow***
- ModelCity Future – Kelowna in the future?

ModelCity Next

- Second piece of the system
- Parcel based "real-time" digital twin
- Comprehensive picture of "tomorrow" (3-5 years)
- Integrates current Development Applications and Building Permit data into ModelCity Now
- Allows us to support decision making based on developments in-stream

ModelCity Next - Example

ModelCity Next:

- 91 dwelling units (known)
- 162 people (estimate)
- 2 CRU / 6,426 ft² (known)
- 10-15 jobs (estimate)

ModelCity Next (3-5 years)

- Current estimated population 350
- Future estimated population 1,675

Visualizing ModelCity Next

ModelCity System

- ModelCity Now – Kelowna today
- ModelCity Next – Kelowna tomorrow
- ***ModelCity Future – Kelowna in the future?***

ModelCity Future

- Third piece of the system
- Parcel based "what-if" scenario driven model (5-20 years)
- Calculates development capacity using zoning regulations
- Identifies likelihood of redevelopment by parcel
- Used to anticipate and evaluate potential long-term growth

ModelCity Future – Development Capacity

ModelCity Future – Likelihood

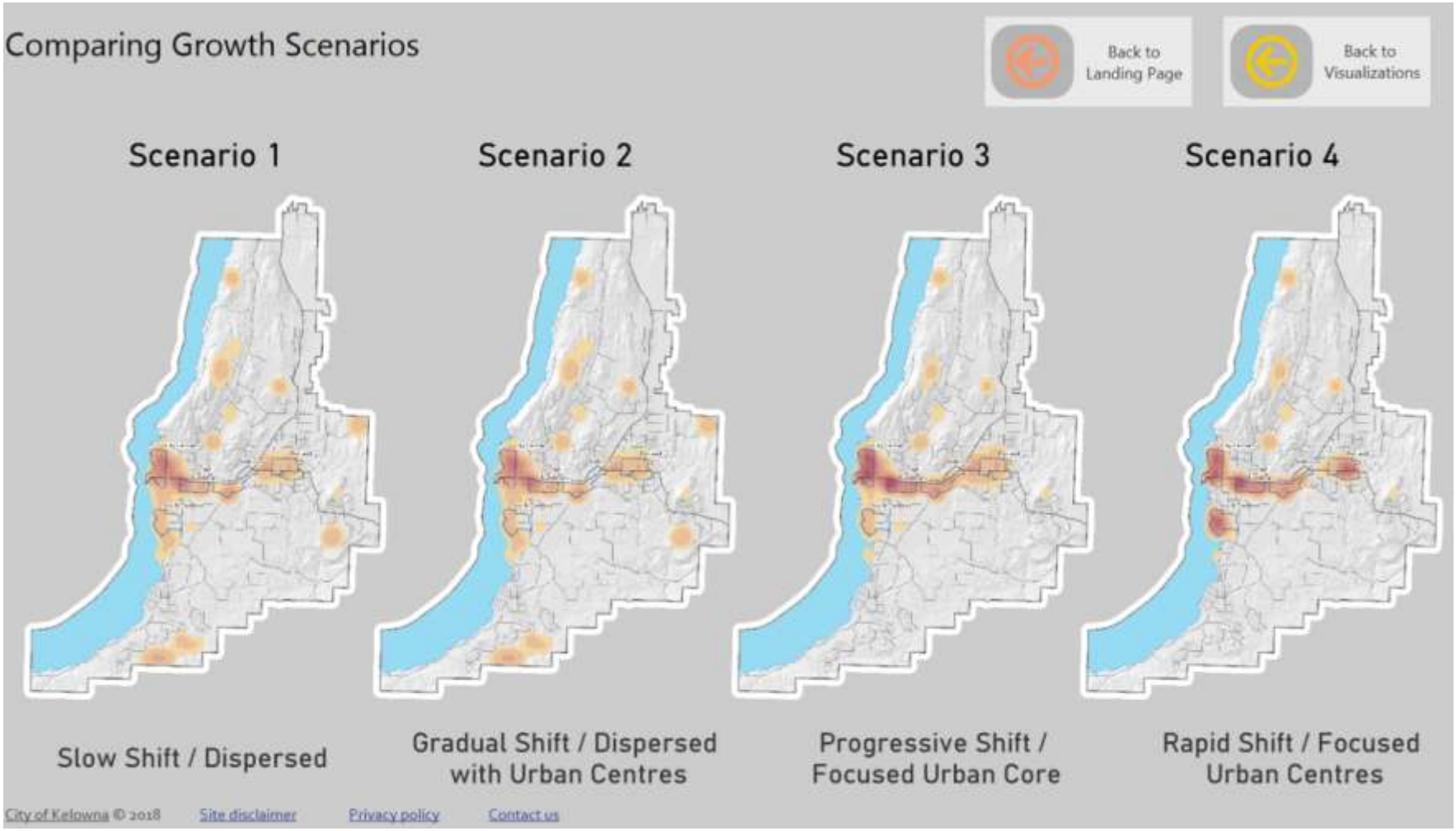
- Likelihood of development:
  - Improvement ratio - BCAA
  - Provincial home owner grant
  - Parcel consolidation

ModelCity Review

Official Community Plan 2040

- 25,000 new units by 2040 (50,000 people)
- Needed to create multiple future growth scenarios in order to understand tradeoffs of growth options
- Dashboard to visualize and evaluate growth scenarios
- Educational tool to understand the tradeoffs between growth patterns

Growth Scenarios Visuals



Growth Scenarios Metrics

City of Kelowna

Livable Communities

This indicator provides a picture of how each scenario contributes to the creation of amenity-rich complete communities with a range of housing options.

Desired Trend / Target

The Healthy Housing Strategy sets the goal of 75% of all new units in the form of Multi-family housing as well as the goal of having 90% of residents within walking distance of parks and neighbourhood amenities. The scenario with the highest percentage of new units in the form of multi-family along with proximity to park and neighbourhood services will be ranked highest.

New Growth within 400m of a Park (%)

Slow Shift / Dispersed
86% Within 400m of Park
1 scenario

Gradual Shift / Dispersed with Urban ...
86% Within 400m of Park
2 scenario

Progressive Shift / Focused Urban Core
89% Within 400m of Park
3 scenario

Rapid Shift / Focused Urban Centres
90% Within 400m of Park
4 scenario

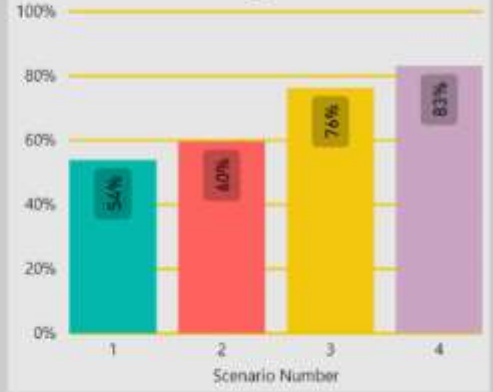
Scenario
1 2 3 4

New Growth by Housing Split (%)

Account Scorecard (Relative Ranking)

Scenario	Housing Split	Neighbourhood Services	Proximity to Park	Total
Slow Shift / Dispersed	3	1	2	**2**
Gradual Shift / Dispersed with Urban Centres	4	2	2	**3**
Progressive Shift / Focused Urban Core	2	3	3	**3**
Rapid Shift / Focused Urban Centres	1	4	4	**3**

Growth within 400m of Neighbourhood Services (%)



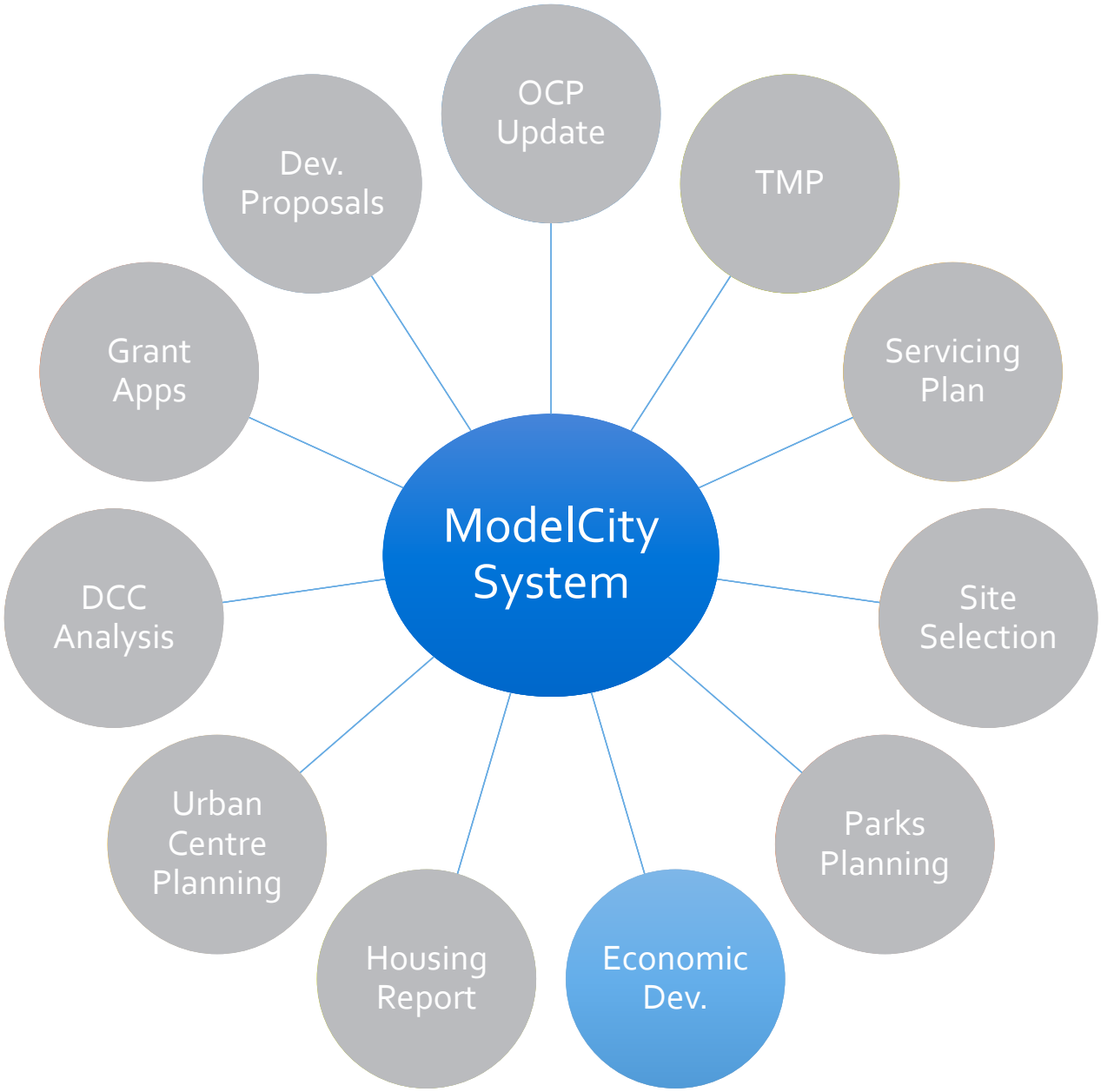
Sub Account Details

Scenario Number	ScenarioName	New Single-detached Units	New Multi Units	New Units Close to Park	New Growth within 400m of services (%)
1	Slow Shift / Dispersed	8,738	15,435	18,222	54%
2	Gradual Shift / Dispersed with Urban Centres	7,081	15,905	18,488	60%
3	Progressive Shift / Focused Urban Core	4,724	19,952	19,259	76%
4	Rapid Shift / Focused Urban Centres	2,502	20,989	19,324	83%

Back

Growth Scenario in 3D

City of Kelowna


ModelCity System
OCP Update
TMP
Servicing Plan
Site Selection
Parks Planning
Economic Dev.
Housing Report
Urban Centre Planning
DCC Analysis
Grant Apps
Dev. Proposals

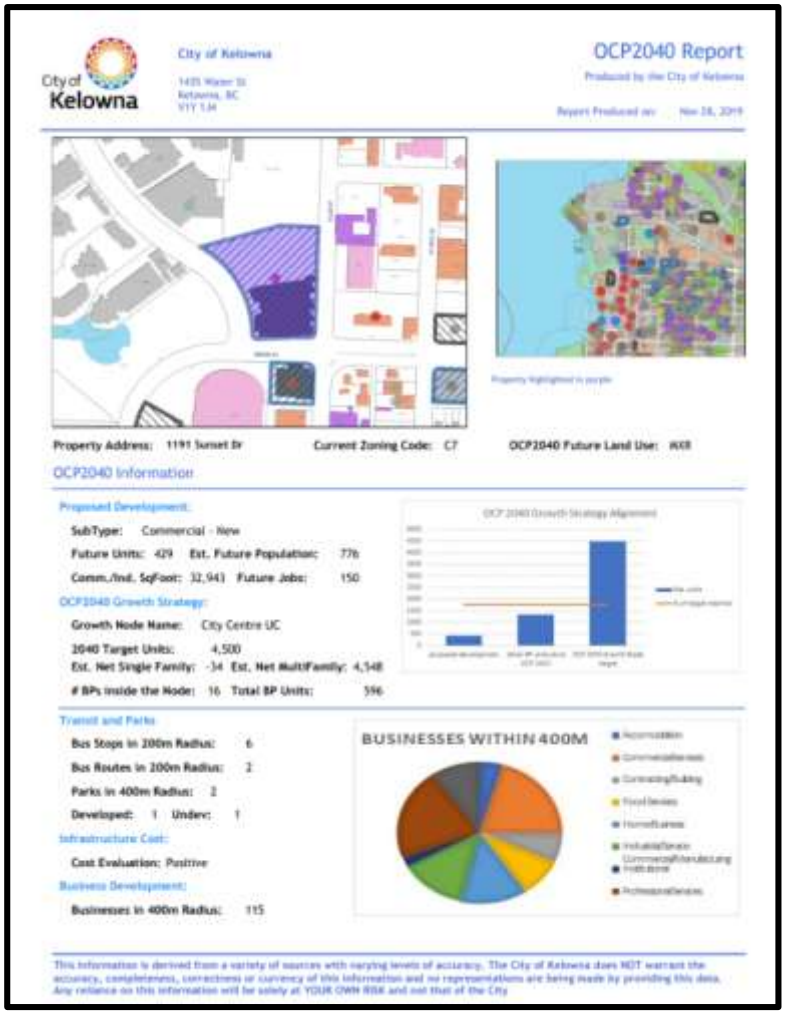
Economic Development

Estimate of Existing Conditions	5km buffer
Estimated Number of Residential Dwelling Units	36,200
Estimated Current Population	66,500

Estimates of Near-term Future Growth	
Estimated Number of Residential Dwelling Units in Planning Process	3,900
Estimated Future Population	7,700

OCP 2040 Implementation

- Use ModelCity to measure OCP 2040 implementation in real-time
- Hit the ground running
- Timely and consistent information



ModelCity Summary

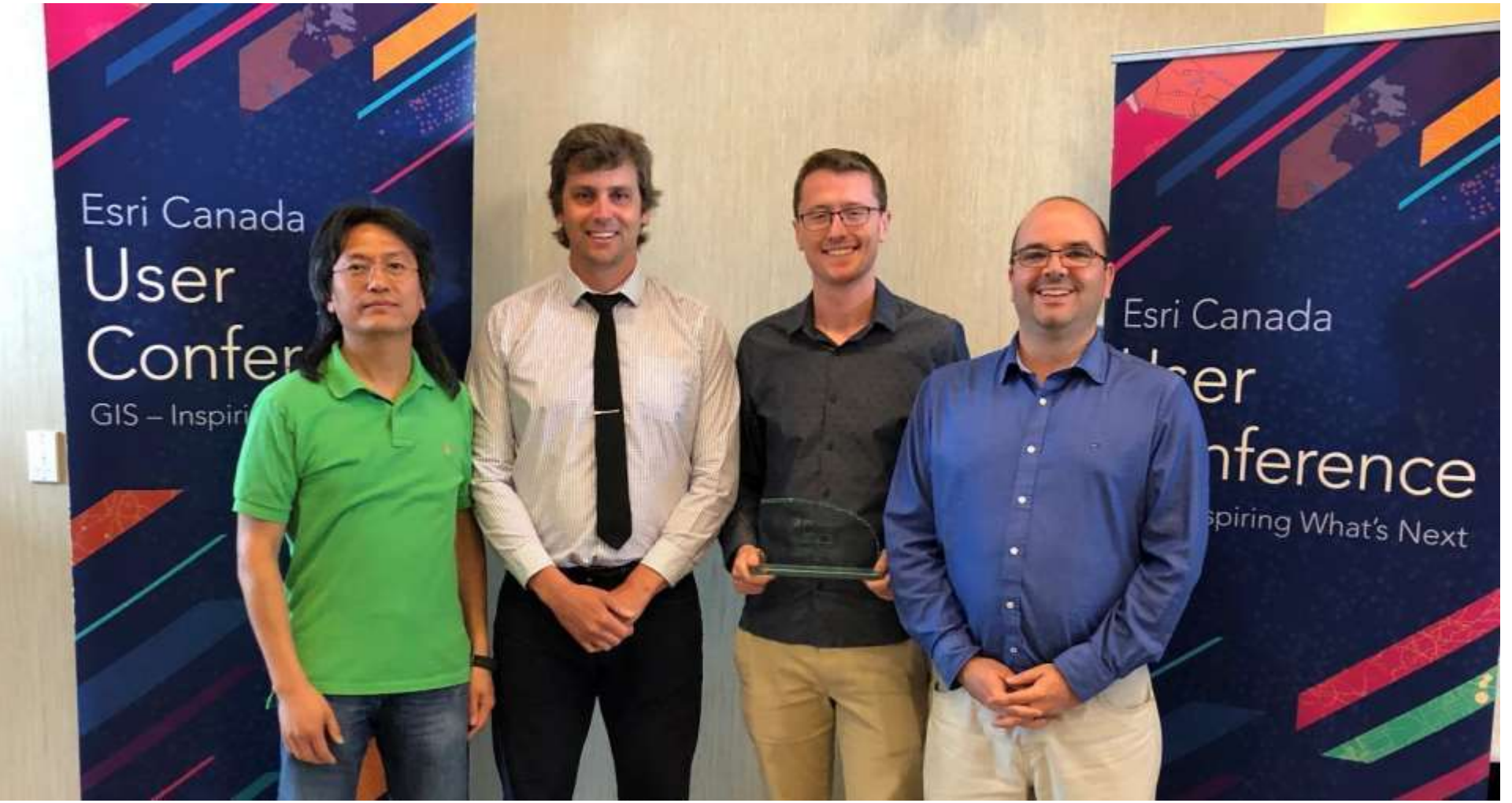
esri Canada

City of Kelowna

ESRI Canada Award of Excellence 2019

Presented to City of Kelowna for Innovation & Collaboration using GIS

ModelCity Team



ModelCity Summary