ENSF 692 Final Project Report

Spring 2025

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Group #3

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# Executive Summary

This report analyzes Calgary's housing and demographic trends using 2,577 records from three City of Calgary open datasets spanning 2016-2017. Our analysis addresses three critical urban planning questions that help city planners understand where Calgary is growing and where housing pressures are emerging.

## Research Questions

1. Which city sectors are growing fastest? - To identify where infrastructure investment is needed
2. Which sectors have the highest property values? - To understand Calgary's premium real estate markets
3. How do inner-city and suburban areas grow differently? - To understand Calgary's urban development pattern.

## Major Findings

* Southeast sector leads city growth with +3.5% population increase, demonstrating the strongest demographic momentum
* West sector commands Calgary's highest property values at $523,021 average assessment, despite smaller population
* Continued suburban sprawl pattern as suburban areas grow (+2.1%) while inner-city communities experience population decline (-0.5%)

# Data Sources

We merged three City of Calgary open datasets [1] – [3]:

1. **Civic Census by Community and Dwelling Structure** - Provides population counts, dwelling types, and vacancy data across all Calgary communities
2. **Assessments by Community** - Contains median residential property valuations that reflect market conditions and investment patterns
3. **Communities by Ward** - Geographic classification system linking communities to wards, sectors, and development characteristics

**Time Period:** Analysis focused on 2016-2017 as these were the only years with complete assessment data across all three datasets.

## Data Quality and Processing

* Scale: 2,577 community-year observations covering 248 distinct Calgary communities
* Completeness: 78.5% usable data (2,024 valid records for analysis)
* Data Integrity: Successfully merged three datasets using community names as primary keys
* Missing Values: 8% of records missing sector classification, primarily industrial areas

## Derived Metrics

|  |  |  |
| --- | --- | --- |
| Metric | Purpose | Interpretation |
| **VACANCY\_RATE** | Housing market health | <3% indicates tight market, >7% suggests oversupply |
| **GROWTH\_MOMENTUM** | Demographic trajectory | Year-over-year population change shows community vitality |

# Research Findings and Analysis

## Question 1: Fastest-Growing City Sectors

**Methodology:** Aggregated population and housing data by Calgary's geographic sectors, calculated year-over-year growth rates, and assessed whether housing supply keeps pace with population growth.

**Results:**

|  |  |  |
| --- | --- | --- |
| **Sector** | **Population Growth** | **Market Assessment** |
| Southeast | **+3.5%** | Fastest growth sector |
| North | +2.1% | Strong growth |
| Northeast | +1.8% | Moderate growth |
| South | +0.7% | Moderate growth |
| Centre | +0.8% | Slow growth |
| East | -1.3% | Population decline |
| Northwest | -1.1% | Population decline |
| West | -0.1% | Stable |

Key Insight: Southeast Calgary demonstrates the strongest population momentum (+3.5%), while three sectors (East, Northwest, West) experienced population decline.

**Planning Implications:** City should prioritize Southeast for accelerated permitting processes and infrastructure planning to prevent housing shortages.

## Question 2: Premium Property Markets

Methodology: Ranked Calgary sectors by average median residential assessment values to identify premium real estate markets and understand the relationship between population size and property values.

Results:

|  |  |  |  |
| --- | --- | --- | --- |
| Sector | Avg Assessment | Total Population | Market Position |
| WEST | $523,021 | 247,641 | Premium market |
| SOUTH | $484,939 | 451,152 | High value/high-density |
| CENTRE | $484,502 | 388,762 | Urban premium |

Key Insight: West sector commands Calgary's highest property values ($523,021 average) despite having the smallest population among major sectors, indicating exclusive/low-density premium development.

Planning Implications: The inverse relationship between population density and property values suggests Calgary's premium markets are characterized by lower-density, exclusive development patterns rather than high-density urban cores.

## Question 3: Inner-City vs Suburban Development Patterns

**Methodology:** Classified Calgary communities as Inner-City or Suburban based on historical development patterns, then compared growth trajectories, investment flows, and housing market dynamics.

**Results:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Area Type | Population Growth | Median Assessment Growth | Vacancy Rate (2017) | Development Pattern |
| Suburban | +2.1% | **+2.6%** | 7.8% | Continued expansion |
| Inner-City | -0.5% | -3.7% | 9.0% | Population decline |
| Difference | **+2.6pp** | **+6.3pp** | **-1.2pp** | Favors suburban sprawl |

Key Insight: Both area types experienced property value changes during 2016-2017, with suburban assessments growing (+2.6%) while inner-city assessments declined (-3.7%).

**Planning Implications:** This trend indicates ongoing urban development challenges. Policy should focus on reversing inner-city population decline through revitalization incentives, improved transit, and amenity development, while managing suburban infrastructure costs and environmental impacts of continued sprawl.

# Program Execution Screenshots

## **Figure 1: Clean** Dataset **Module Output**

A black background with text

AI-generated content may be incorrect.

## **Figure 2: Calgary Housing Analysis Program Invalid Community Name Error Handling**

A screenshot of a computer program

AI-generated content may be incorrect.

## **Figure 3: Calgary Housing Analysis Program Invalid Year Error Handling**

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## **Figure 4,5,6: Calgary Housing Analysis Program Successful User Input and Community Profile, Analysis Output, Program Completion and File Export**

A screenshot of a computer program

AI-generated content may be incorrect.

A screen shot of a computer

AI-generated content may be incorrect.

A screenshot of a computer

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# References

[1] Civic Census by Community and Dwelling Structure, City of Calgary, June 2021. [Online]. Available: <https://data.calgary.ca/Demographics/Civic-Census-by-Community-and-Dwelling-Structure/set9-futw>

[2] Assessments by Community, City of Calgary, June 2021. [Online]. Available: <https://data.calgary.ca/Government/Assessments-by-Community/p84b-7zbi>

[3] Communities by Ward, City of Calgary, June 2021. [Online]. Available: <https://data.calgary.ca/Government/Communities-by-Ward/jd78-wxjp>