

An abstract graphic on the left side of the slide featuring several 3D rectangular blocks of varying heights and colors (red, orange, teal, and light blue) arranged in a cluster, resembling a bar chart or data visualization.

Improving Emergency Shelter Utilization Through Time Series Forecasting

Course: MNGT-257 Business Certificate Capstone

Instructor: Chantelle Lamotte

Mentor: Randy Thornhill, Director of Organizational Impact, YW Calgary

Date: 16-04-2025

A data-driven solution to support vulnerable
Calgarians during shelter surges

Meet Our Team Members

We are a group of dedicated business students from SAIT collaborating to deliver a comprehensive pitch for our project.

01



Saran Poocharoen

02



**Deanna Rose
Quiambao**

03



Prajwal Nagaraj

04



**Thi Hanh Nguyen
Phan**

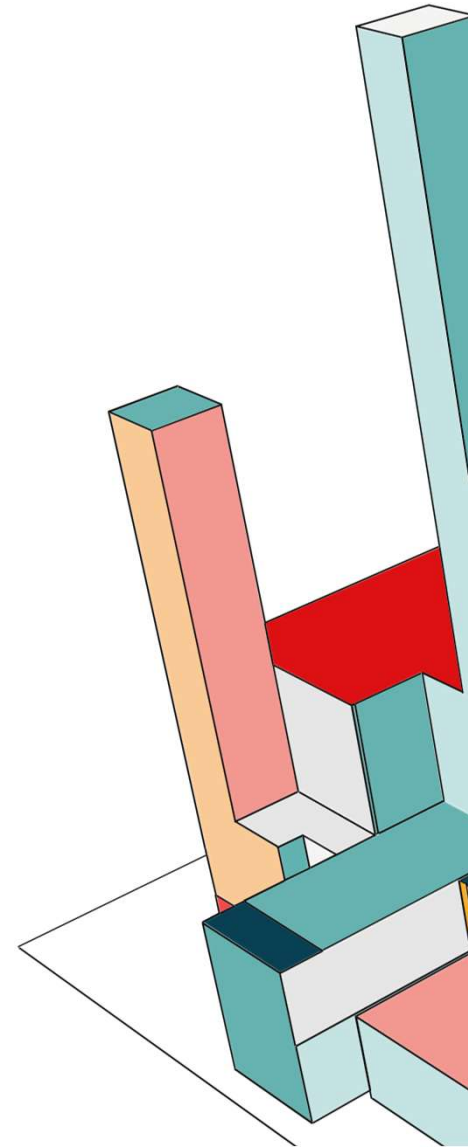
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Genevieve Ababa

AGENDA

- ❑ Pitch Purpose
- ❑ The Problem & Solution
- ❑ Project Scope
- ❑ Competitive Analysis
- ❑ Methodology
- ❑ Final Products
- ❑ Conclusion



Pitch Purpose

"Meet Maya. Last December, she walked 5 km in -30°C to find a shelter, only to be told it was full."

What if we could have predicted that, and guided her somewhere with space?





The Problem & Our Solution



- Calgary shelters face overcrowding and/or under-utilization due to demand fluctuations.
- Current platforms provides real-time data but lacks forecasting.
- Vulnerable populations may be turned away during high-demand periods.



- We built a simple, intuitive platform that forecasts shelter occupancy in advance.
- Predict shelter occupancy trends for the next 2 years.
- It helps staff act early, plan better, and prevent people from being turned away.

Project Scope



Data source:
Open Data Alberta

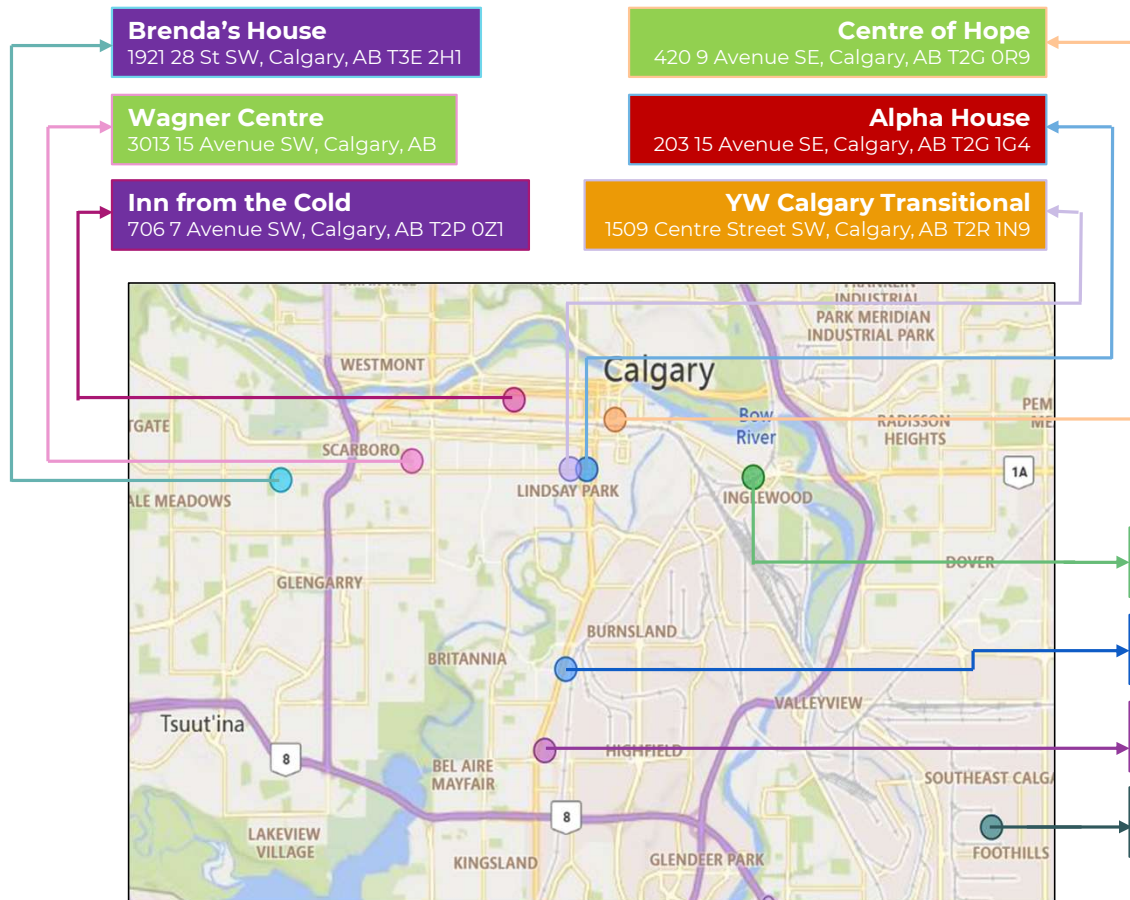


Shelters Daily Occupancy
Year 2013 – 2024

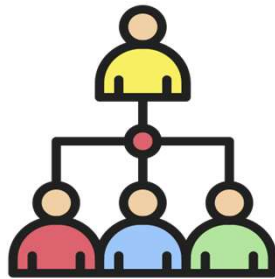


10 Shelters in Calgary, AB

- 1 Intoxicated
- 3 Transitional
- 3 Adult Emergency
- 1 Women Emergency
- 2 Family Emergency



Target Market

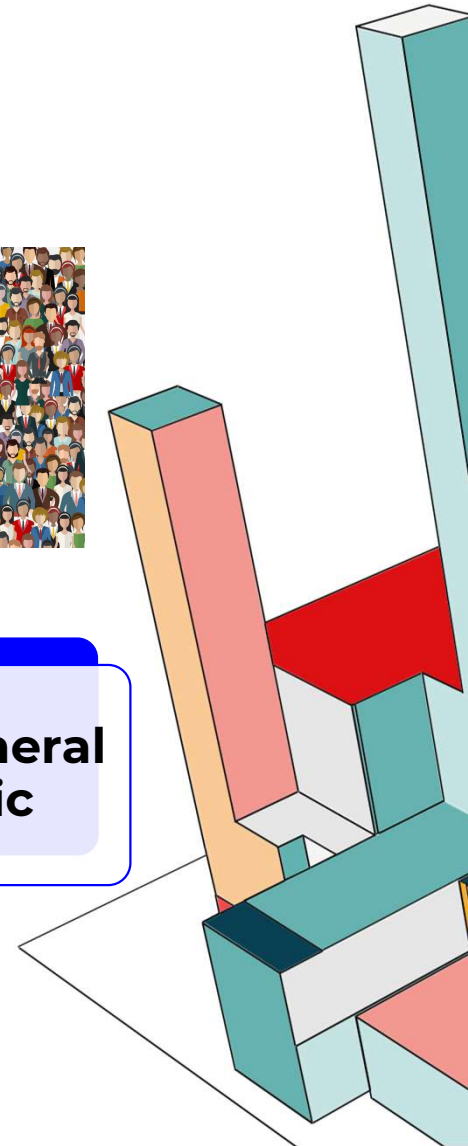


**Frontline
Workers &
Caseworkers**

**Shelter
Management
& Staff**

**Government
Agencies &
Public
Services**

**The General
Public**

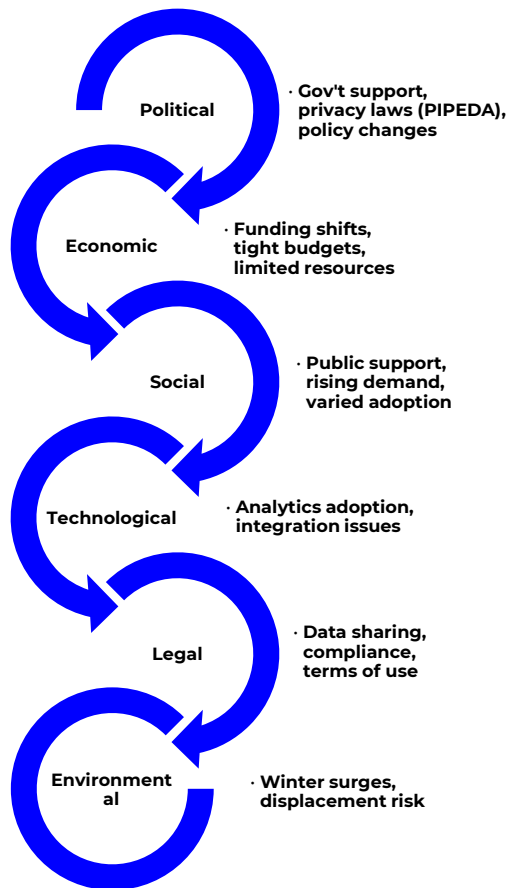


Competitors

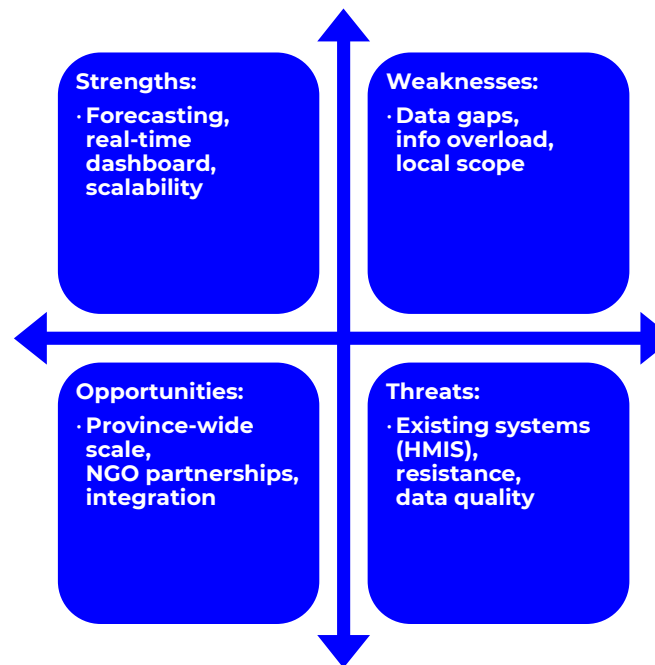
Existing Shelter Systems	Strengths	Weaknesses
Shelterlink App	Real-time bed tracking; expansion potential	No predictive analytics; data consistency issues
Homelessness Management Information System (HMIS)	Tracks performance; privacy compliant	No predictive analytics; limited participation
Coordinated Access and Assessment (CAA) systems	Real-time matching; service integration	No predictive analytics; inconsistent data systems
ShelterSafe	User-friendly; 24-hour helpline	No real-time tracking; limited to domestic violence shelters
DomesticShelters.org	Multilingual; lists shelter needs	No predictive analytics; no real-time updates
My Sister's Keeper	Women's homelessness focus; local engagement	Small capacity; no real-time tracking
Find Shelter	Lists shelters by location; offers extra services	No predictive analytics; no real-time updates
iHEAL App	Links to resources; safety planning for women	No real-time tracking; focused on safety, not housing

Competitive Analysis

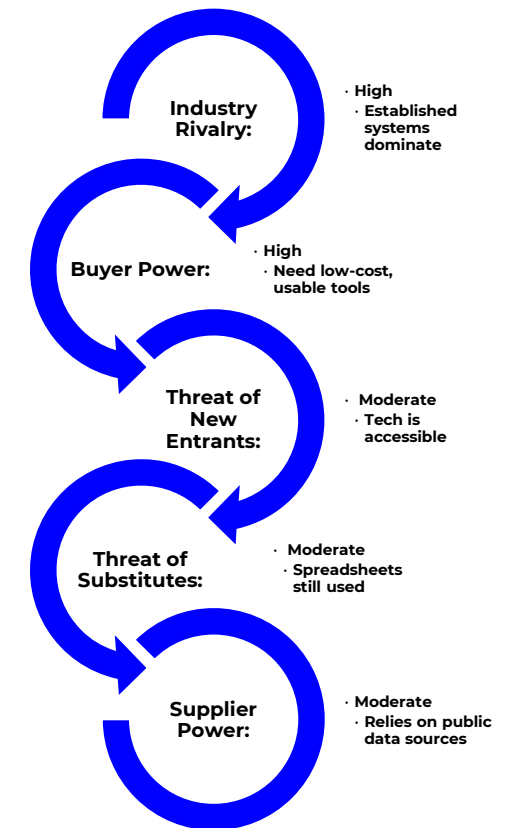
PESTLE – EXTERNAL FACTORS



SWOT – Strategic Scan



Porter's Five Forces Market Dynamics






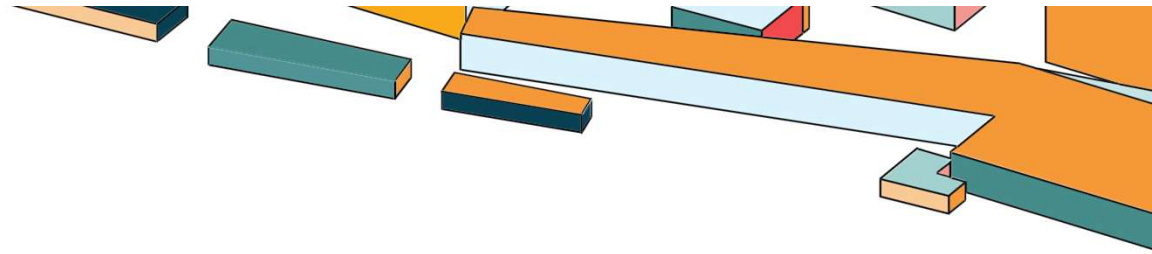
COMPETITION

Why We are Different

Feature	Existing Tools	Our Solution
Real-time Tracking	Yes	Yes
Forecasting (Next 7 days – 2 years)	No	Yes
Easy to Use	No	Yes
Designed with Shelters	No	Yes
Affordable for Nonprofits	No	Yes



Methodology



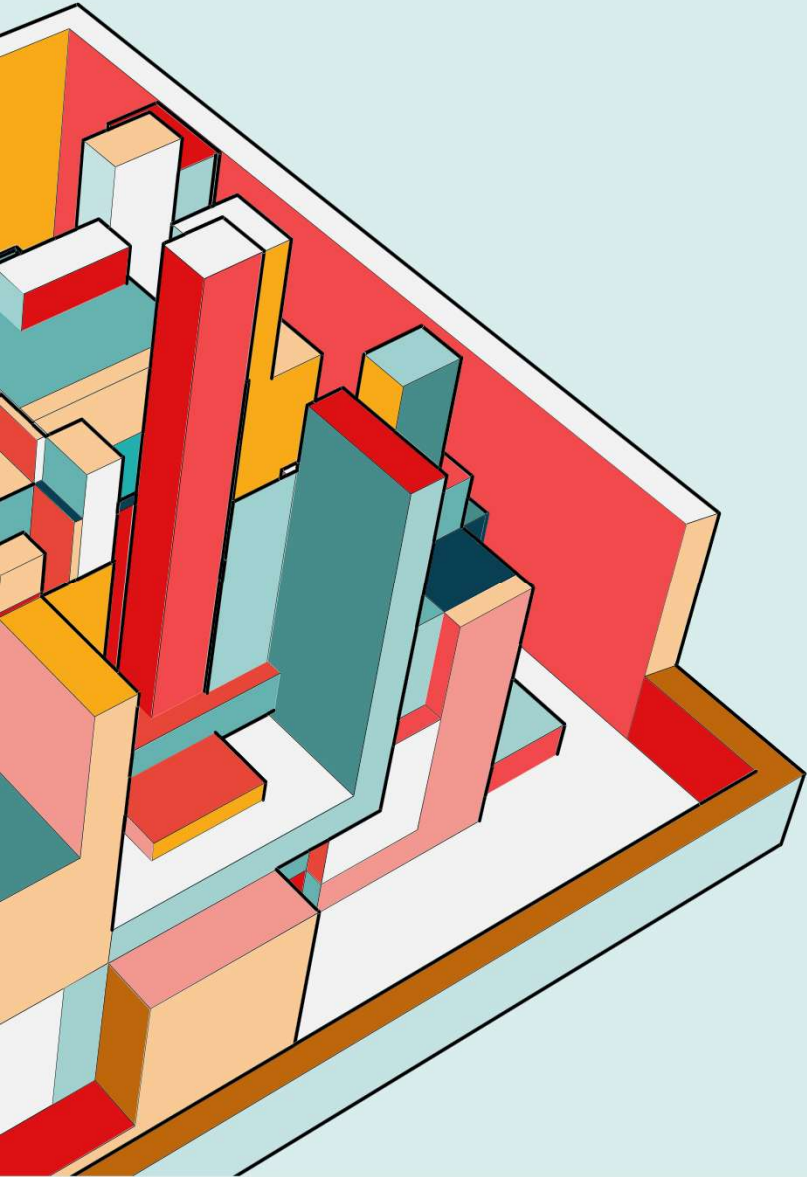
Agile approach with weekly sprints



Close mentorship with YW
Calgary

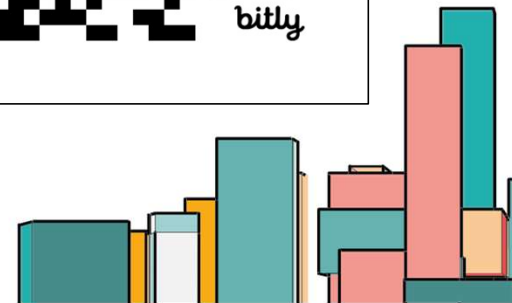
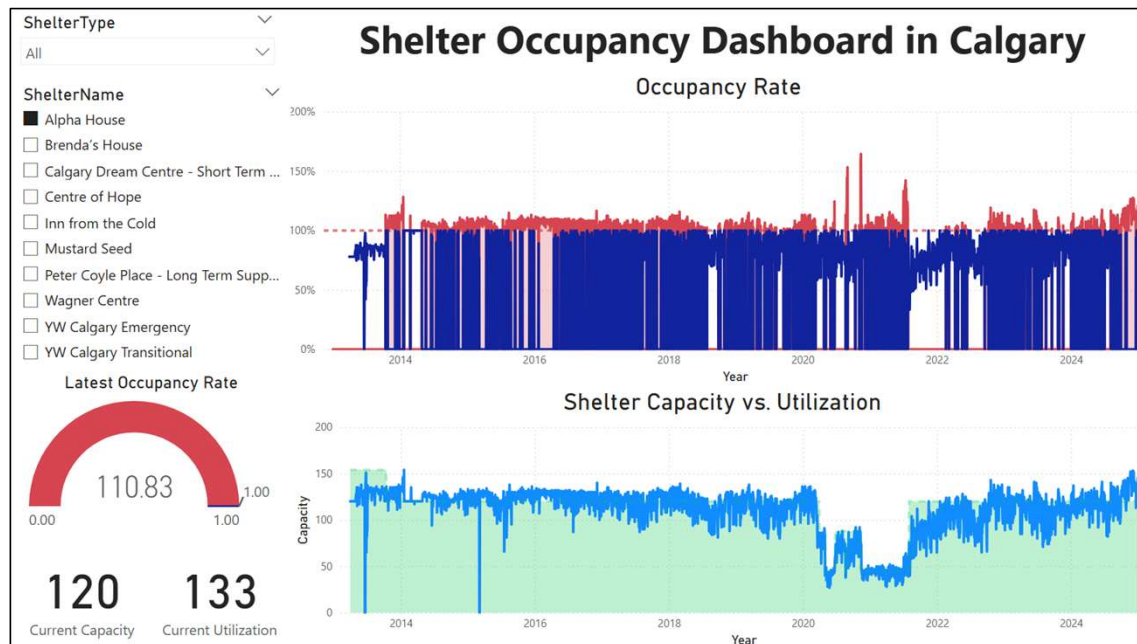


Regular testing, feedback loops,
and stakeholder reviews

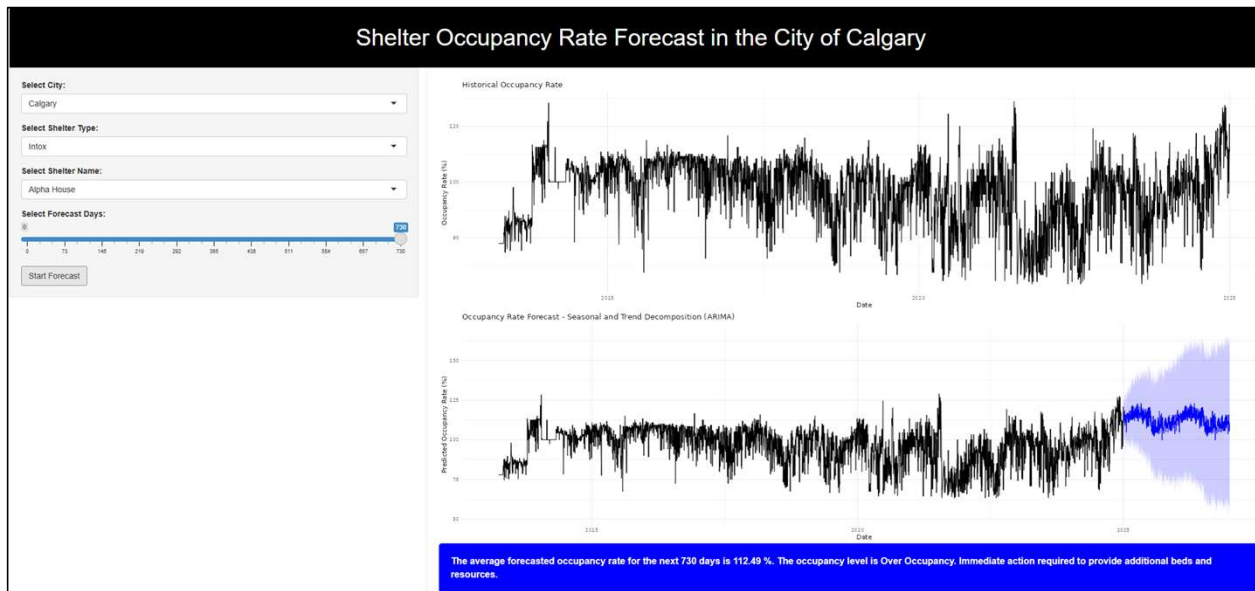


Demo: How It Works

Prototype 1: Shelter Occupancy Dashboard



Prototype 2: Shelter Occupancy Rates Forecast Web-App

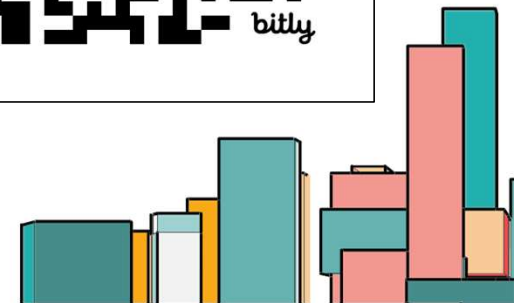


Model: Seasonal Decomposition Auto-Regressive Integrated Moving Average (ARIMA)



Prototype 3: Action Plan Framework

Occupancy level	Occupancy Rate	Action
Low Occupancy	< 60%	Address underutilized resources
Moderate Occupancy	60% - 85%	Maintain Efficiency & Flexibility
High Occupancy	85% - 100%	Proactive Intervention is Necessary
Over Occupancy	>100%	Immediate action required



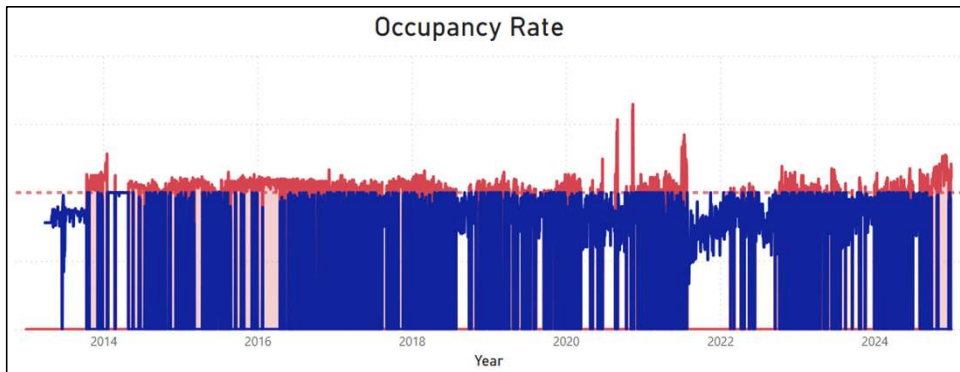
Prototype 3: Action Plan Framework

Occupancy level	Occupancy Rate	Notes
Low Occupancy	< 60%	Underutilized resources
Moderate Occupancy	60% - 85%	Normal operations
High Occupancy	85% - 100%	Risk of overcrowding
Over Occupancy	>100%	Need more beds immediately



Supporting Materials

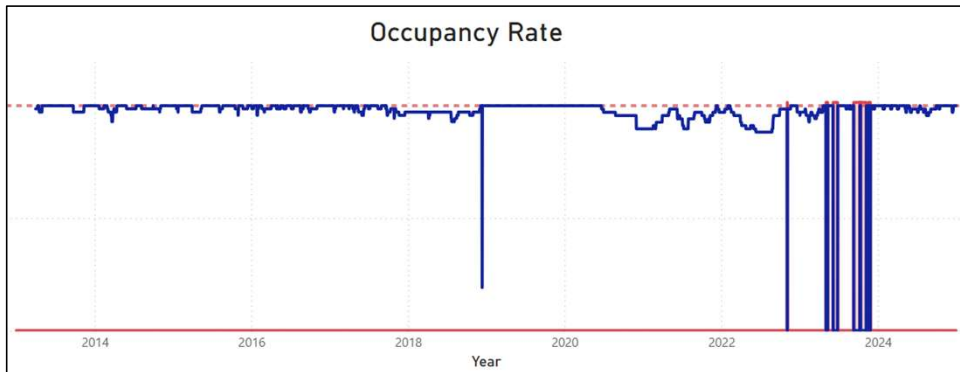
Historical Analysis: 2013 - 2024



Alpha House | Intox

Trend: **Stable**

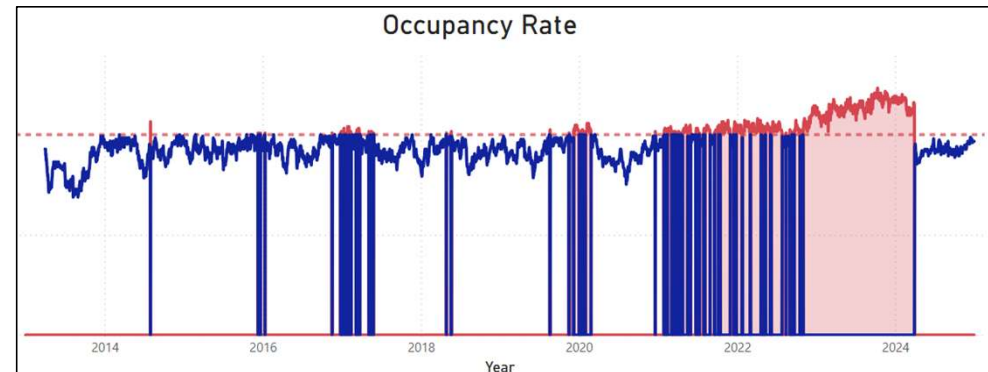
Occupancy level: **Frequent Over-occupancy**



Peter Coyle Place | Transitional

Trend: **Stable, Rare Fluctuations**

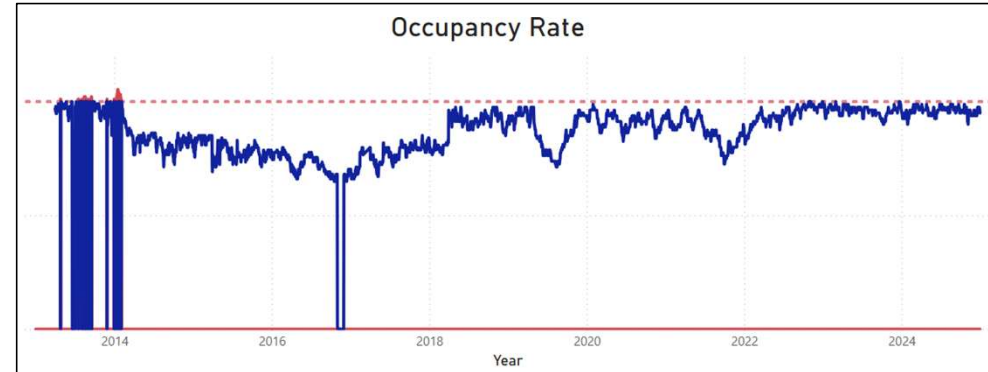
Occupancy level: **Frequent High to Full Occupancy**



Calgary Dream Centre | Transitional

Trend: **Increasing**

Occupancy level: **Over-occupancy, especially after 2021**



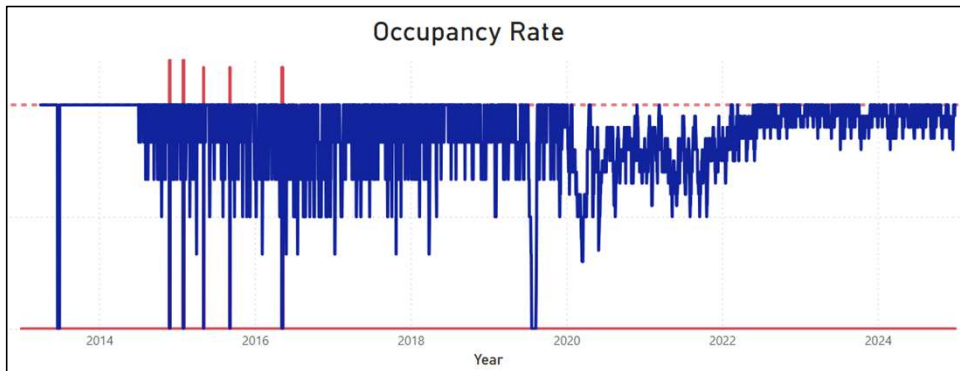
YW Calgary Transitional | Transitional

Trend: **Fluctuating from 2014 to 2022, stabilized afterwards**

Occupancy level: **High to Moderate Occupancy**

Supporting Materials

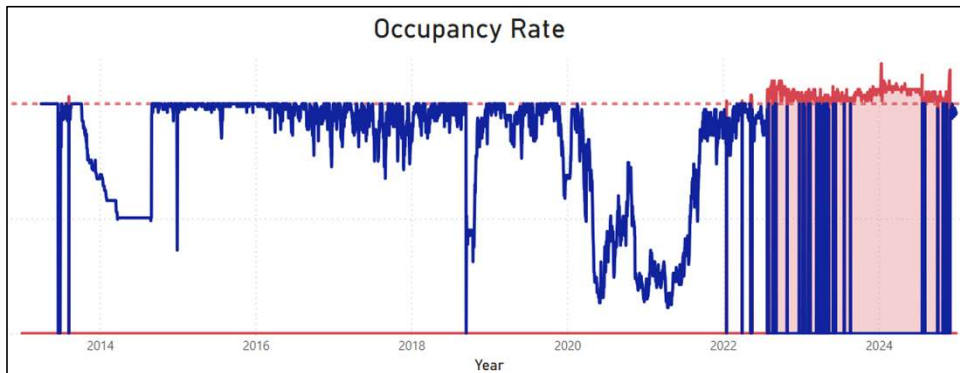
Historical Analysis: 2013 - 2024



YW Calgary Emergency | Women Emergency

Trend: **Stable, Decreased on year 2020 to 2022**

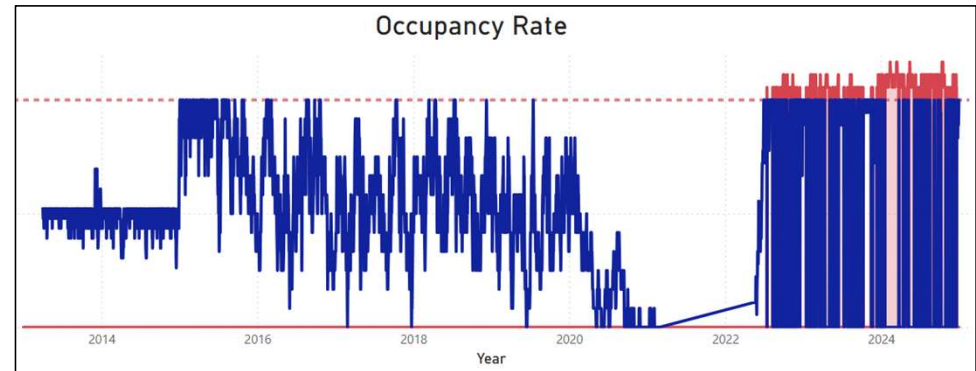
Occupancy level: **Consistent High Occupancy**



Centre of Hope | Adult Emergency

Trend: **Stable until 2018, Decreased in 2020, Remained stable afterwards**

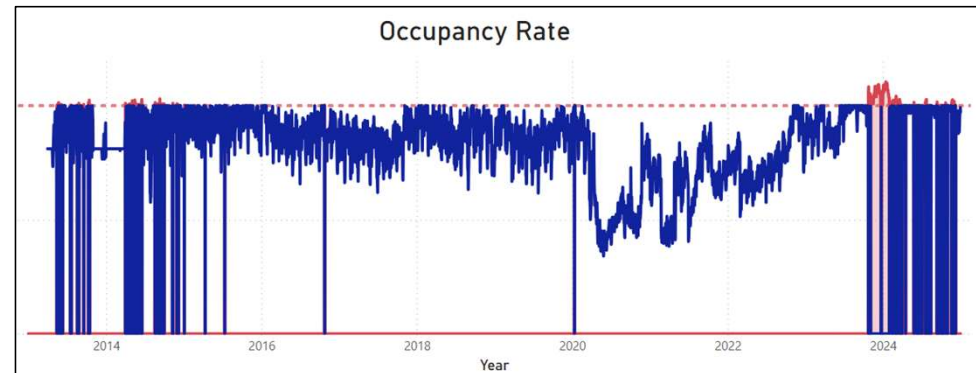
Occupancy level: **Over Occupancy starting from middle 2022**



Wagner Centre | Adult Emergency

Trend: **Decreasing until 2022, stable years after**

Occupancy level: **Low to Moderate until 2022, Over Occupancy years after**



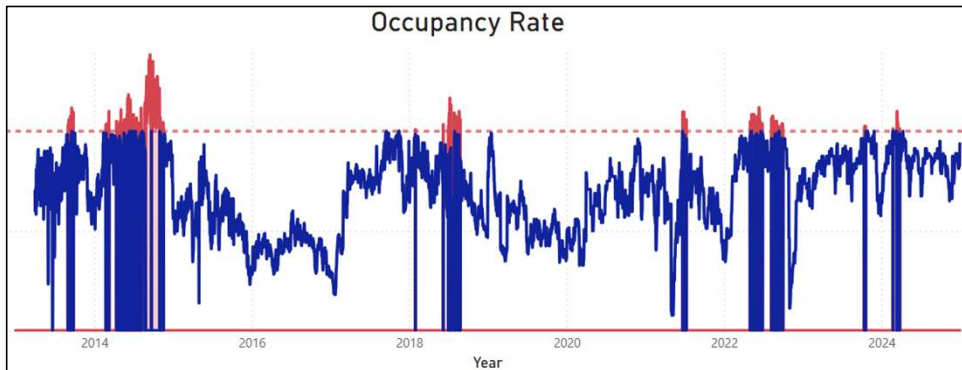
Mustard Seed | Adult Emergency

Trend: **Stable until 2019, Decreased in 2020, Increased again afterwards**

Occupancy level: **High Occupancy**

Supporting Materials

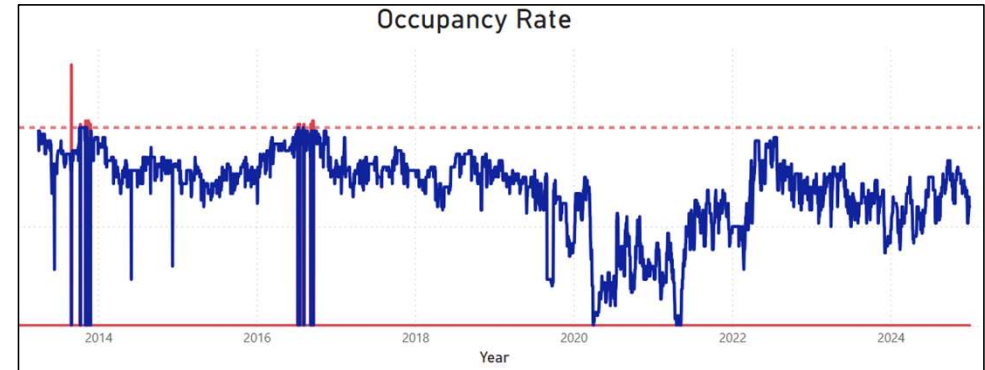
Historical Analysis: 2013 - 2024



Inn from the Cold | Family Emergency

Trend: **Obvious Fluctuations**

Occupancy level: **Over Occupancy during 3rd and 4th Quarter**
Low to Moderate during 1st and 2nd Quarter



Brenda's House | Family Emergency

Trend: **Fluctuating**

Occupancy level: **Moderate Occupancy**

Results and Analysis

Forecast Analysis: 2025-2026





Shelters Affected	Occupancy Level in the Next 2 Years	Analysis
Alpha House	Critical Over-occupancy	Immediate Action Required
Wagner Centre	Critical Over-occupancy	Immediate Action Required
Mustard Seed	Critical Over-occupancy	Immediate Action Required
Peter Coyle Place	High Occupancy	Proactive Intervention is Necessary
Centre of Hope	High Occupancy	Proactive Intervention is Necessary
Calgary Dream Centre	High Occupancy	Proactive Intervention is Necessary
YW Transitional	High Occupancy	Proactive Intervention is Necessary
YW Emergency	High Occupancy	Proactive Intervention is Necessary
Inn from the Cold	High Occupancy	Proactive Intervention is Necessary
Brenda's House	Moderate Occupancy	Maintain Efficiency & Flexibility



Recommendation for Critical Over-Occupancy Shelters

Alpha House | Wagner Center | Mustard Seed

Intox | Adult Emergency | Adult Emergency

	Allocate funding for possible expansion of shelter spaces	Request additional funding from stakeholders for possible expansion of shelter spaces (i.e. Government of Alberta, Partners, Sponsors, Donors, etc.)	NLT 3 rd Quarter Year 1
		Secure temporary shelter spaces, such as hotels or private-market apartments, to provide immediate relief and increase capacity.	Year 1
	Increase partnerships with other emergency shelters in the city	Collaborate with other emergency shelters within the city to facilitate the referral of clients and adopt housing-first support approach.	Continuously
		Participate in the Service Hub Model program led by the GoA to establish referral of individuals experiencing homelessness to a wider range of resources.	Year 1
	Improve case management of the clients in the shelter	Review the Average Length of Stay (ALOS) at the shelters and determine specific clientele who have overstayed their intended shelter duration.	Within 1 st Quarter Year 1
		Establish a seasonal staffing pool and maintain a list of well-trained on-call staff, while complying with the standard case management ratio to client.	NLT Year 2
	Conduct Future Studies and Innovations	Conduct comprehensive future studies to assess additional factors that influence the demand for shelter services, such as economic trends, seasonal fluctuations, and client needs.	Year 1




Recommendation for High Occupancy Shelters

Peter Coyle Place | Centre of Hope | Calgary Dream Centre | YW Transitional |

Transitional | Adult Emergency | Transitional | Transitional |


YW Emergency | Inn from the Cold

Women Emergency | Family Emergency

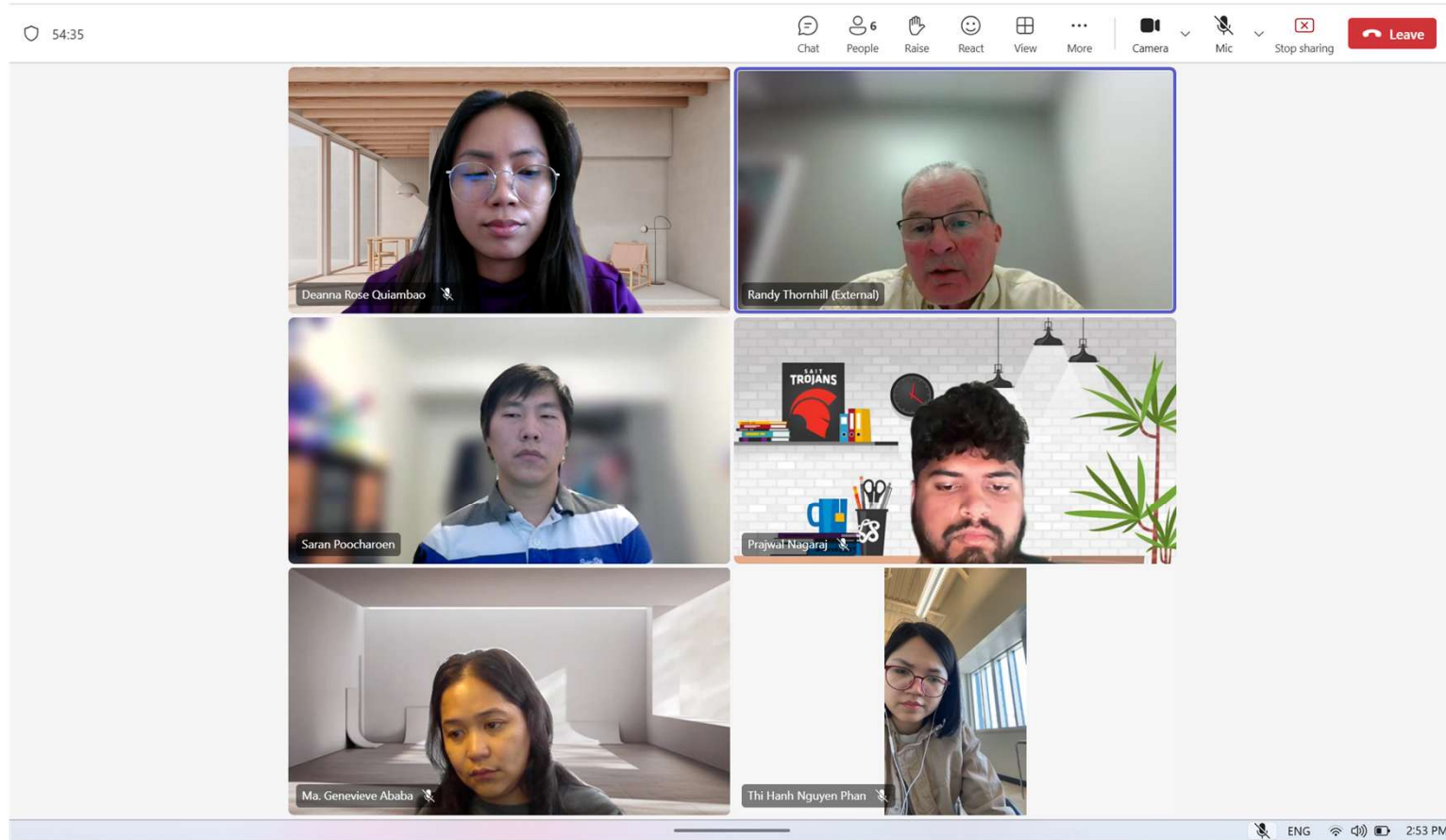
	Develop and implement new strategies for better tracking	Utilize the Web app to track the occupancy rate for one week in advance.	Weekly
		Develop and implement more effective planning and resource allocation based on the tracking of occupancy rate weekly.	Quarterly
	Utilize the capacity more effectively	Develop the resource allocation plans (staff, facilities) during underused capacity.	Quarterly
		Coordinate with other housing partners to utilize underused capacity using the predictive occupancy rate from the Web app.	Continuously
	Understand and communicate progress on shelter demands	Conduct needs analysis by assessing more factors which can affect shelter demands (seasonal, economic trends, client's needs).	Year 1
		Working with community/housing partners to develop and implement a "by-name" list to support coordination of resources and understand changes in shelter demands in Calgary.	Quarterly Year 1
		Develop communication strategies for regular communication with and receiving information from the community/housing partners for shelter demands.	Quarterly

Recommendation for Moderate Occupancy Shelter

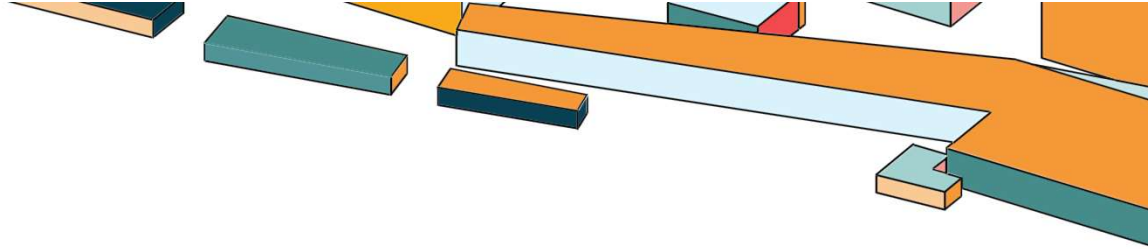
Brenda’s House | Family Emergency

 <div>Improve Resource Allocation and Capacity Utilization</div>	Maintain 90% occupancy rate in moderate occupancy shelters with a balance of staff allocation to meet client needs.	Monthly
	Ensure that the available shelter spaces are occupied during high-demand periods by coordinating with other community partners.	Year 1

Presentation to Industry Mentor



CapCon 2025



*With our Industry Mentor
Mr. Randy Thornhill, YW Calgary*



*With our Capstone Instructor
Ms. Chantelle LaMotte, School of Business, SAIT*

THANK YOU

"Let's build smarter, more responsive shelters – starting today."

Do you have any questions?

