**Problem Statement**

To efficiently utilize the City of Bellevue’s resources, we are working to optimize preset routes for covering snow plowing and deicing city operations.

**Objectives**

This project consists of optimizing a tool for total covered distance that will save cost and time for the City of Bellevue. Also, we plan on identifying and eliminating any repetitive road traffic by developing clear road clearing operations visibility.

**Current Systems**

- Three supervisors at dispatch
- Stick Post-it notes with the names of the operators on map
- Live operations via the city cameras.
- Monitors with weather information.
- Two operators (one driving and one navigating) using a binder to navigate

**Opportunities for Process Optimization**

- Create a consistent process of deicing and snow plowing operations
- Recommend an efficient routing order for the operators
- Provide insight into the Bellevue current operations

**Process Flow Map**

1. **Task 1**
   - Deicing Routes
   - Gathering Relevant Information
   - Using Same Method
   - Assumptions for Deicing
   - Starting Location
   - Sample Matrix of Route Distances
   - Route Optimization Modeling Tasks

2. **Task 2 & 3**
   - City Wide Routes
   - Snow Plowing
   - City Wide Route Priority
   - Neighborhood Routes

3. **Task 4**
   - SnowDawgz Test
   - Driving Routes
   - Validation

**Recommendations**

- Implement the routing order recommendations
- Digitalize mapping and current operations
- Implement recommended routes into fleet navigation platform

**Validation**

- Test drove Google-OR's generated routes in Bellevue
- Simulation model, Simio
- Implemented the Google-OR generated route orders into Google maps

**Continuous Improvement**

- The digital worksheet will provide a way for identifying gaps for improvement.

**Cost Analysis and Goal Budgeting for Deicing**

- Cost Analysis:
  1. Labor: hourly rate
  2. CaCl₂ (deicing solution): $191.38/ton
  3. One ton truck spreading rate: 20 gallons/mile. Seven yarder truck spreading rate: 15 gallons/mile
- Total estimated cost required to complete deicing is $2500 - $2700