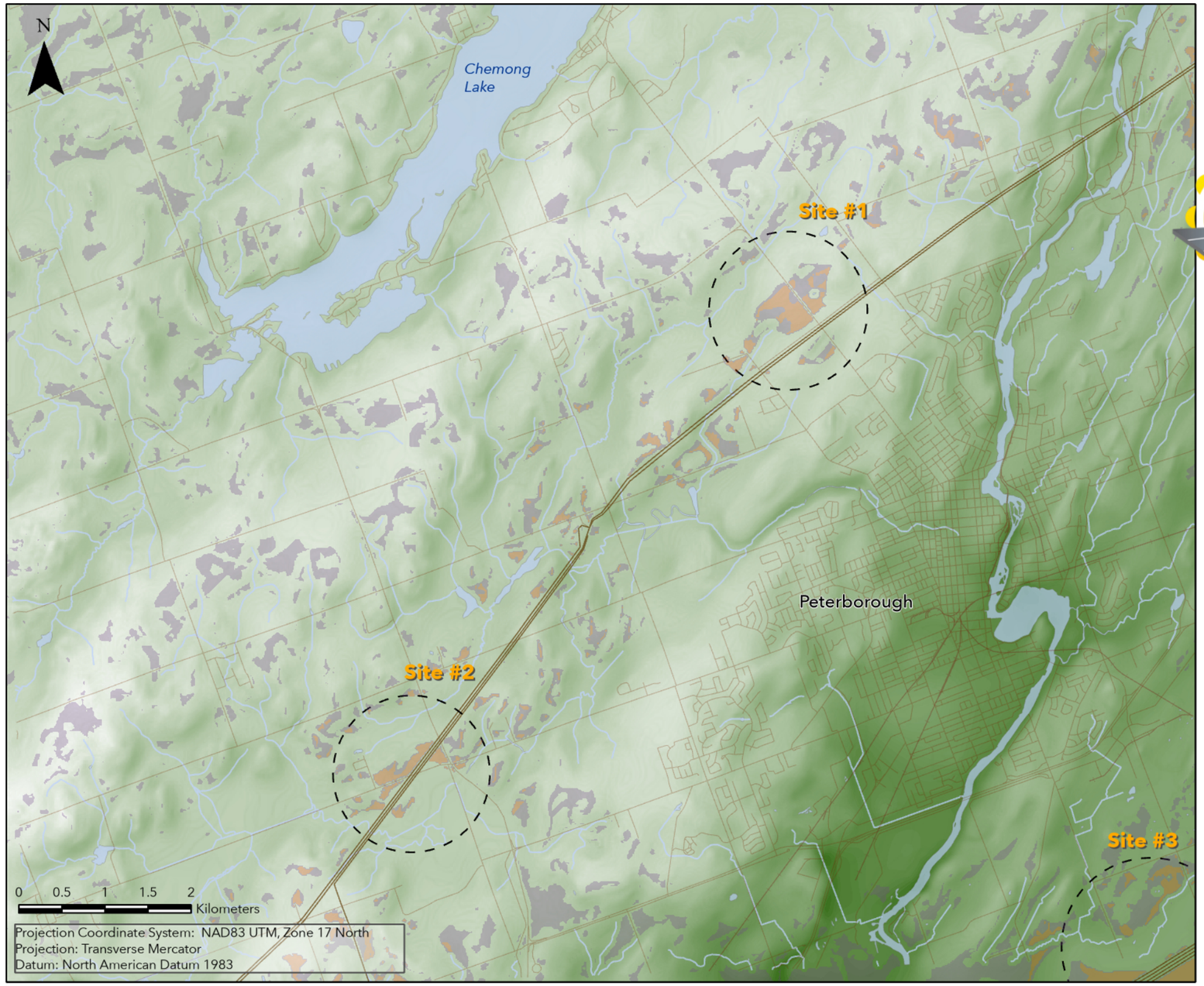


Solar Panel Farm Site Selection

A site suitability analysis for Peterborough, Ontario

The City of Peterborough has a five year plan to invest in a 20-25 hectares photovoltaic (PV) solar panel farm, to meet climate goals and to introduce additional sources of clean energy into the community. While solar panels are an effective method for converting solar radiation and energy into power, site selection is critical to a successful operation.

To help the city maximize on their investment, H&A Spatial Consulting has prepared a multi-criteria analysis to demonstrate the suitability of land within the Peterborough area. Our consulting team have presented the top 3 recommended locations for a solar farm (see 3D perspectives below), for additional review and cost assessments.

Multi-Criteria Decision Analysis

The Topo to Raster technique was used to convert NTS elevation and contour data into a Digital Elevation Model (DEM). This technique provided the highest quality output, and visually appealing hillshade. Aspect and Slope were derived from the DEM, and incorporated as criteria in the multi-criteria analysis, in order to emphasize flat, sunny land. Distance to powerlines was included in the criteria, in order to reduce the cost of infrastructure necessary to connect potential sites to the grid. Additional boolean distance restrictions were derived from various sources. The final formula was (Aspect criteria + Slope criteria + Powerline criteria) * (Distance Restrictions).

Aspect Criteria:
- South-East & South-West (score: 1)
- South (score: 2)

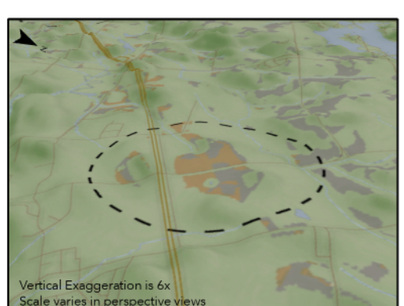
Slope Criteria:
- 2.5 - 5% slope (score: 1)
- 0 - 2.5% slope (score: 2)

Distance Restrictions (Boolean):
- Minimum 20m from eskers
- Minimum 25m from roads
- Minimum 25m from rails
- Minimum 25m from trails
- Minimum 25m from wetlands
- Minimum 50m from water
- Minimum 1km from urban

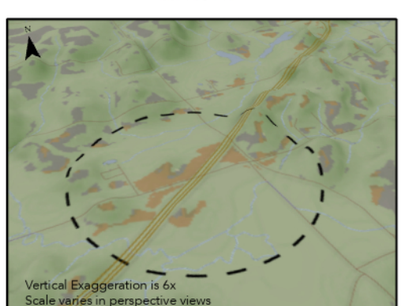
Relation to Powerline Criteria:
- 0 - 20m (score: 0)
- 20 - 500m (score: 3)
- 500 - 1500m (score: 2)
- 1500m+ (score: 1)

Waterbody
Watercourse
Powerline
Road
Railway
Suitable Area (Score: 2 - 5)
Most Suitable Area (Score: 5 - 8)

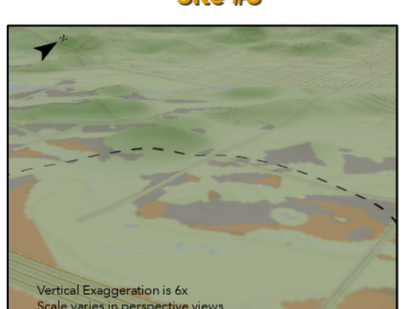
Site #1



Site #2



Site #3



Created by: Adrian Koornneef, Hillary Elliot // Last updated: February 09, 2023 // Software used: ArcGIS Pro Version 3.0.0
Map Sources: Government of Canada (NTS): Roads, Rail, Waterbody, Watercourse / 2017; Government of Ontario (GeoHub): Utility Line / 2020.
Additional Analysis Sources: Government of Canada (NTS): Contour Lines, Elevation Points, Eskers, Built-up Area / 2017; Commission for Environmental Cooperation (NALCMS): Wetlands / 2015; Government of Ontario (GeoHub): Trails / 2022.
Clipart Sources: NicePng, Clipartmax.
Hillshade blending technique: John Nelson Maps (https://www.youtube.com/watch?v=4aefnrQJvMg)