
Geosource
Geo-Exchange Retrofits for
Existing Buildings

# Geosource Energy - Our History

**Stanley Reitsma, P.Eng, Ph.D**
CEO, President, and Board Member

**Peter Reitsma**
VP, Operations and Board Member

**George Reitsma**
VP, Operations and Board Member

- Established in 2004 in Ontario, Canada
- New Headquarters in Manhattan, NYC
- Founded by Stanley Reitsma, P.Eng, PhD in Geological Engineering, with brothers Pete Reitsma and George Reitsma
- 22M sq. ft. of building space with geothermal systems installed.
- Completed NY's largest residential geothermal project with 321 holes drilled.
- Nearly 400 projects delivered to date across Canada and the United States.

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# Geosource Energy - Our History

- Established in 2004 in Ontario, Canada
- Expanded in 2024 to USA
- Specialize in drilling geothermal systems in urban environments
- 400+ projects delivered to date, over 20,000 boreholes installed
- Dedicated fleet of custom geothermal drilling rigs
- Unique retrofit capabilities

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# Retrofit Case Study – Residential Apartment


| | Retrofit Program | New-Build Program |
|---|---|---|
| Building Height | 10 storey | 9 storey |
| GFA (sq.ft.) | 135,000 | 205,000 |
| Units | 113 | 234 |
| Heating Load ($kW_{th}$) | 382 | 1,033 |
| Cooling Load ($kW_{th}$) | 363 | 846 |
| Theme | Fully electrify heating w/ retrofit Community energy asset. | |

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# Retrofit Case Study – Existing Building


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# Retrofit Case Study – New Building


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# Retrofit Case Study – Combined Solution

## Retrofit Building

| | Cooling | Heating |
|---|---|---|
| Geothermal Capacity [$kW_{th}$] | 363 | 382 |
| Geothermal Energy Production [$MWh_{th}$] | 1,086 | 1,719 |
| Ground-side Energy [$kW_{th}$] | 343,268 | 427,368 |

## New Building

| Basis of Design Loads on the GHX | Cooling | Heating |
|---|---|---|
| Geothermal Capacity [$kW_{th}$] | 846 | 1,033 |
| Geothermal Energy Production [$MWh_{th}$] | 792 | 1,144 |
| Ground-side Energy [$kW_{th}$] | 924,185 | 850,974 |

## Combined System

| Basis of Design Loads on the GHX | Cooling | Heating |
|---|---|---|
| Geothermal Capacity [$kW_{th}$] | 1,209 | 1,415 |
| Geothermal Energy Production [$MWh_{th}$] | 1,086 | 1,719 |
| Ground-side Energy [$kW_{th}$] | 1,267,453 | 1,278,342 |

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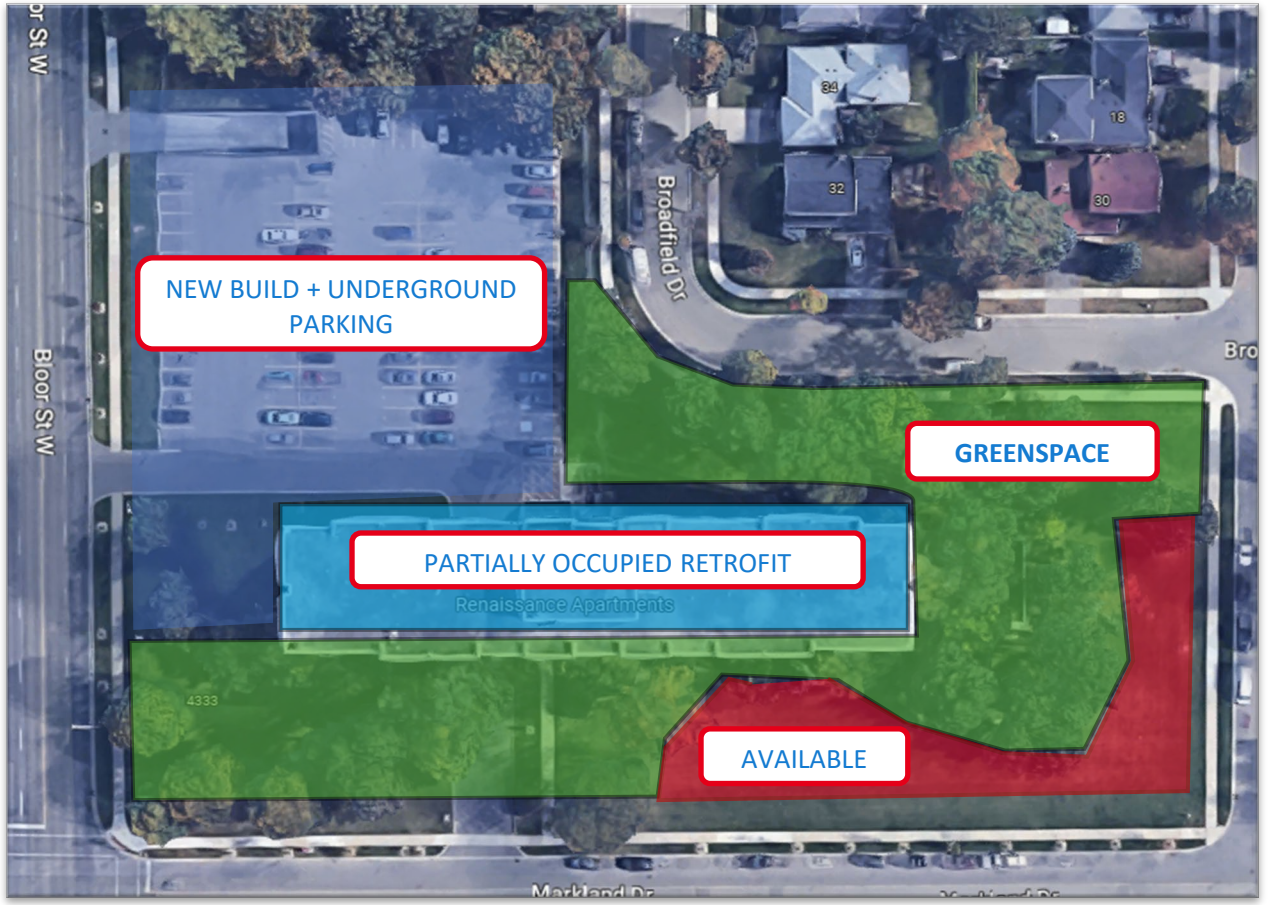
# Retrofit Case Study – Site Constraints

- Borefield size: 113 Boreholes
  - Requires 34,000 sqft of space for drilling on 15’ centres
- Site Area: 137,000 sqft
- Constraints
  - Occupied existing apartment building
  - Uninterrupted Service
  - Mature trees
- **Working area 13,500 sqft**
  - Potential for vertical boreholes at 15’ spacing: 59

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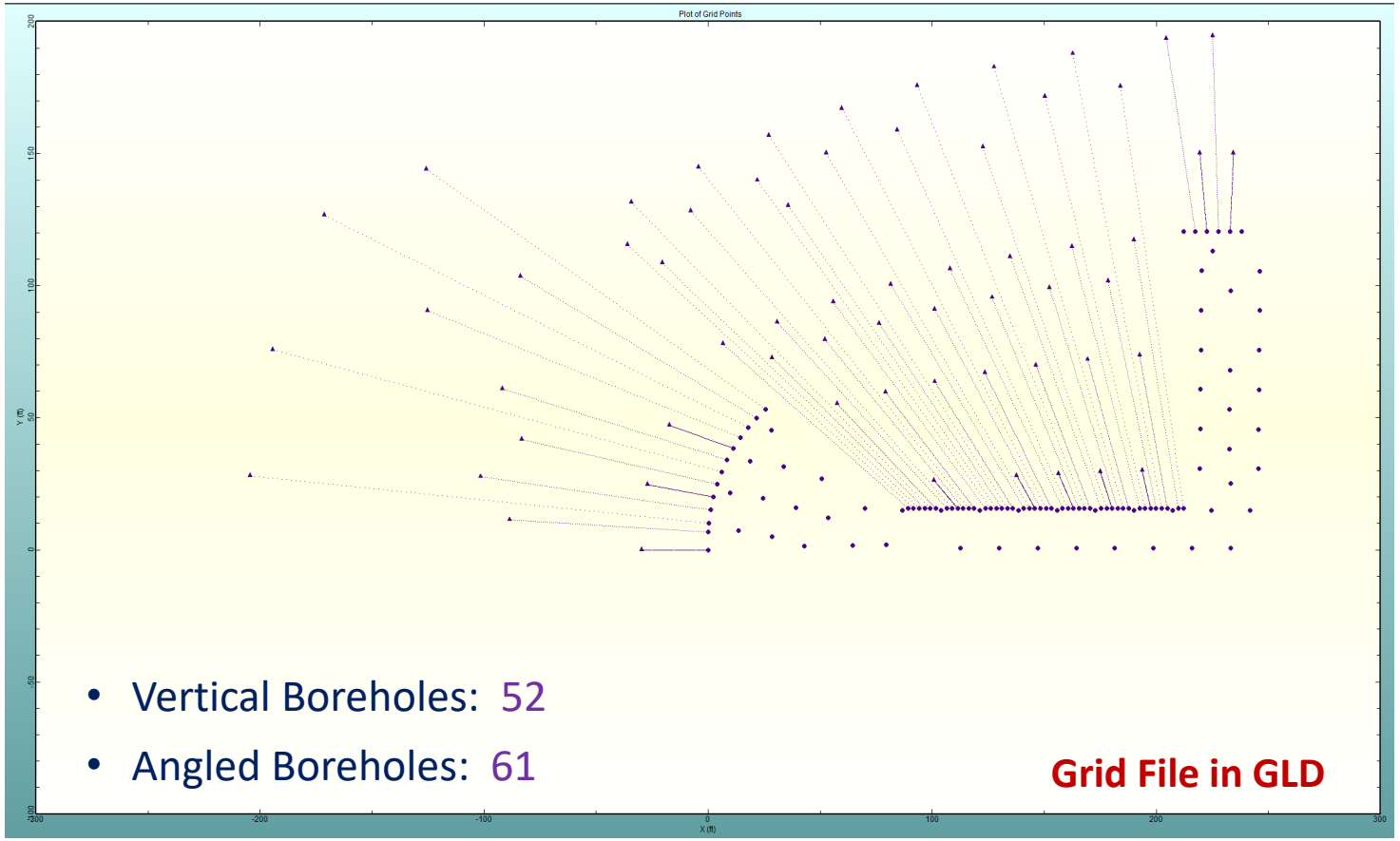
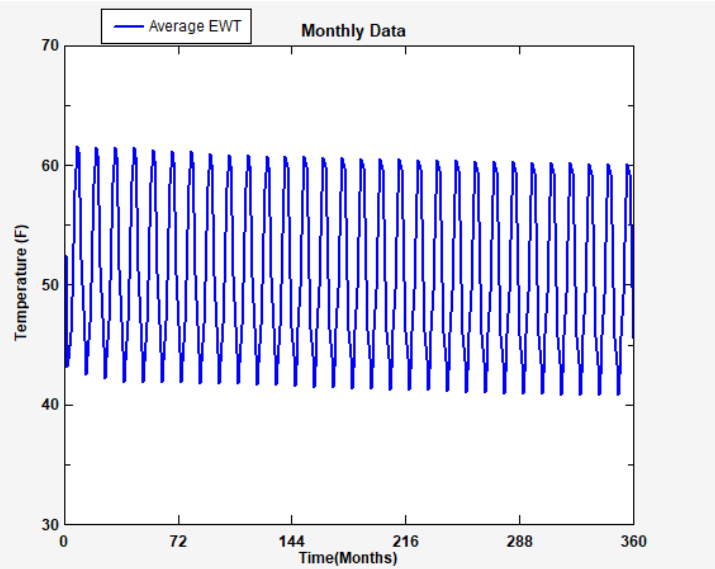
# Retrofit Case Study – Design Development




- Vertical Boreholes: 52
- Angled Boreholes: 61

**Grid File in GLD**

GLD Output

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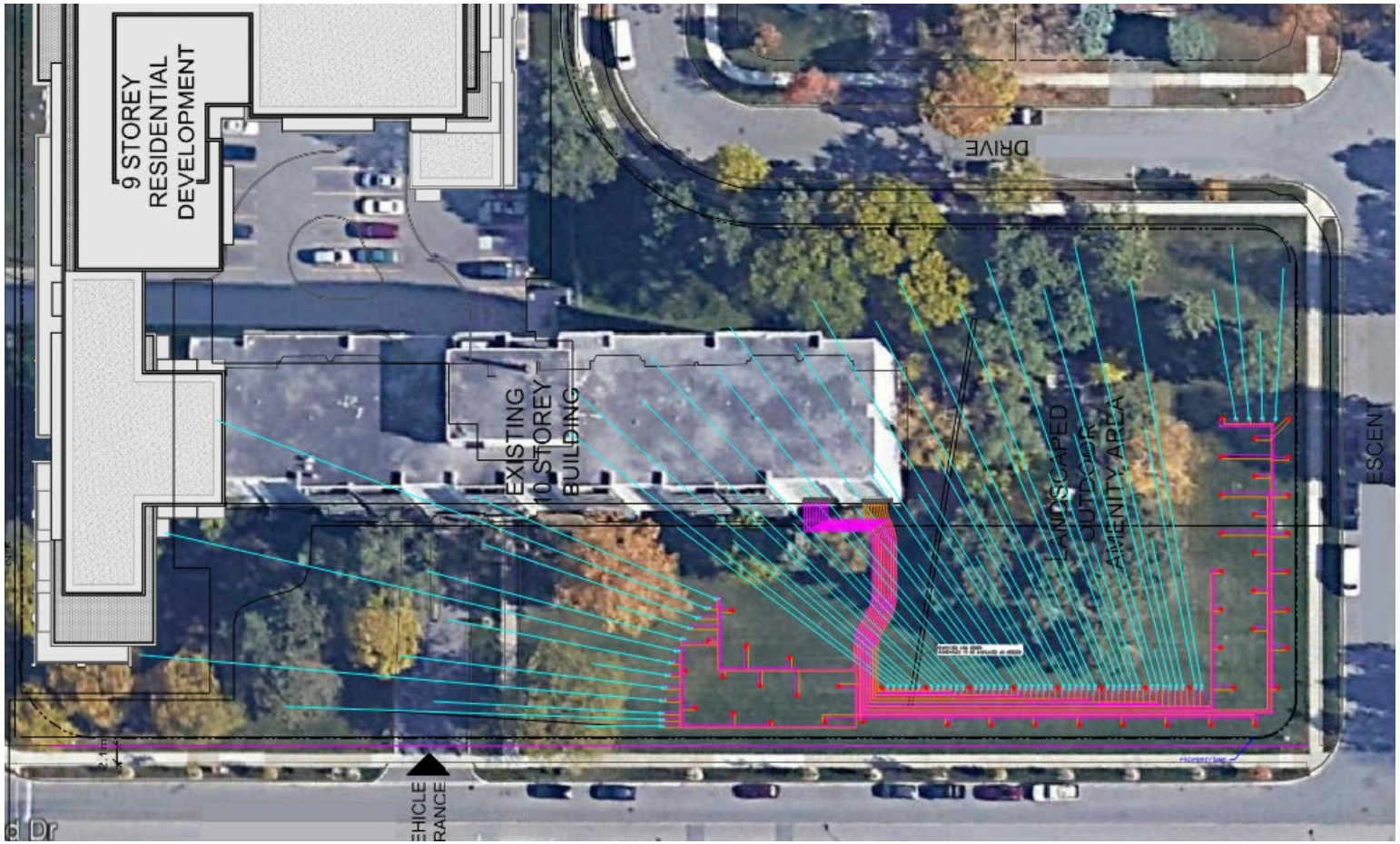
# Retrofit Case Study - Solution




**113 Boreholes to 850 ft. depth**

- 51 vertical boreholes
- 62 angled boreholes
- Angled boreholes spaced at 2.5 ft
- **70% surface area reduction with this solution**





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# Retrofit Case Study - Drilling

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# Retrofit Case Study – Horizontal tie-in

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# Retrofit Case Study - Manifold

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# Retrofit Case Study – Post Installation

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# Elementary School Retrofit, Boston, MA

- Boston's first geothermal retrofit as part of Boston Renew Trust program
- Existing Elementary School
- Project goal to provide better air quality and thermal comfort, and decarbonization
- 20 boreholes to 850 ft
- 25 ft acoustic sound walls were used to provide acoustic protection
- Specialized drilling technique was used to manage spoils and water

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# The Riverie, 1 Java St., Brooklyn

- New York State’s Largest Residential Geo-Exchange System
- 322 boreholes to 599 ft
- Services 834 purpose-built rental housing units.
- Reduce building's greenhouse gas emissions by an estimated 53%
- Single system beneath footprint supports all three towers


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# Humber College Cultural Hub

- Completed in 2023
- LEED Platinum
- Largest zero-carbon institutional building in Ontario (CaGBC)
- Hybrid Mass Timber construction
- 365,000 sqft
- 96 boreholes to 800ft

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# Self Storage

- Geothermal system boosts energy efficiency of storage building
- Enables climate and humidity control for optimal storage conditions
- First large-scale geothermal system in an Ontario storage facility




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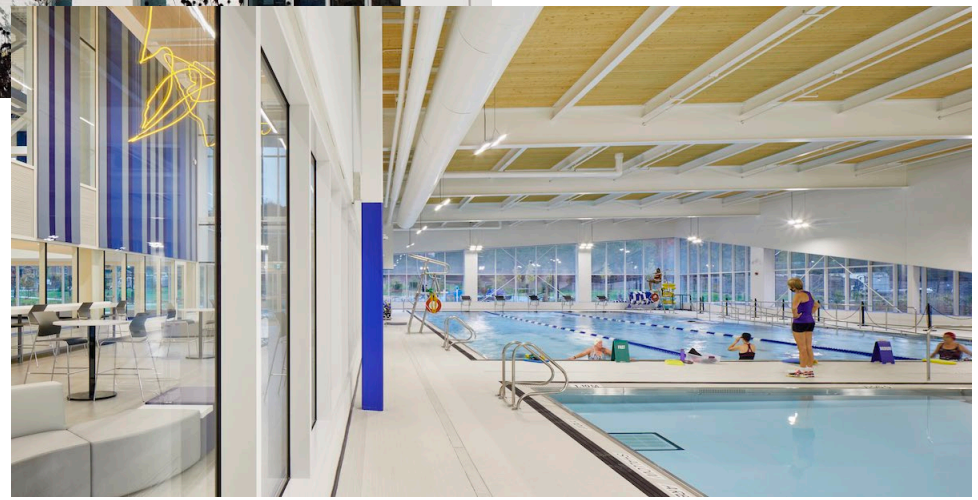
# Oakville Trafalgar Community Centre

- New-build community centre
- Operational since 2019
- 64 boreholes to 600ft
- Provides 100% heating & cooling load for the building
- Supported by 500kW solar system
- First net-zero public pool
- LEED Gold
- 90% GHG reduction compared to similar sized community centre



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