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Trails in Northeast Ohio: Concepts, Challenges, & Technology

Anthony M. Joy

Chief Information Officer
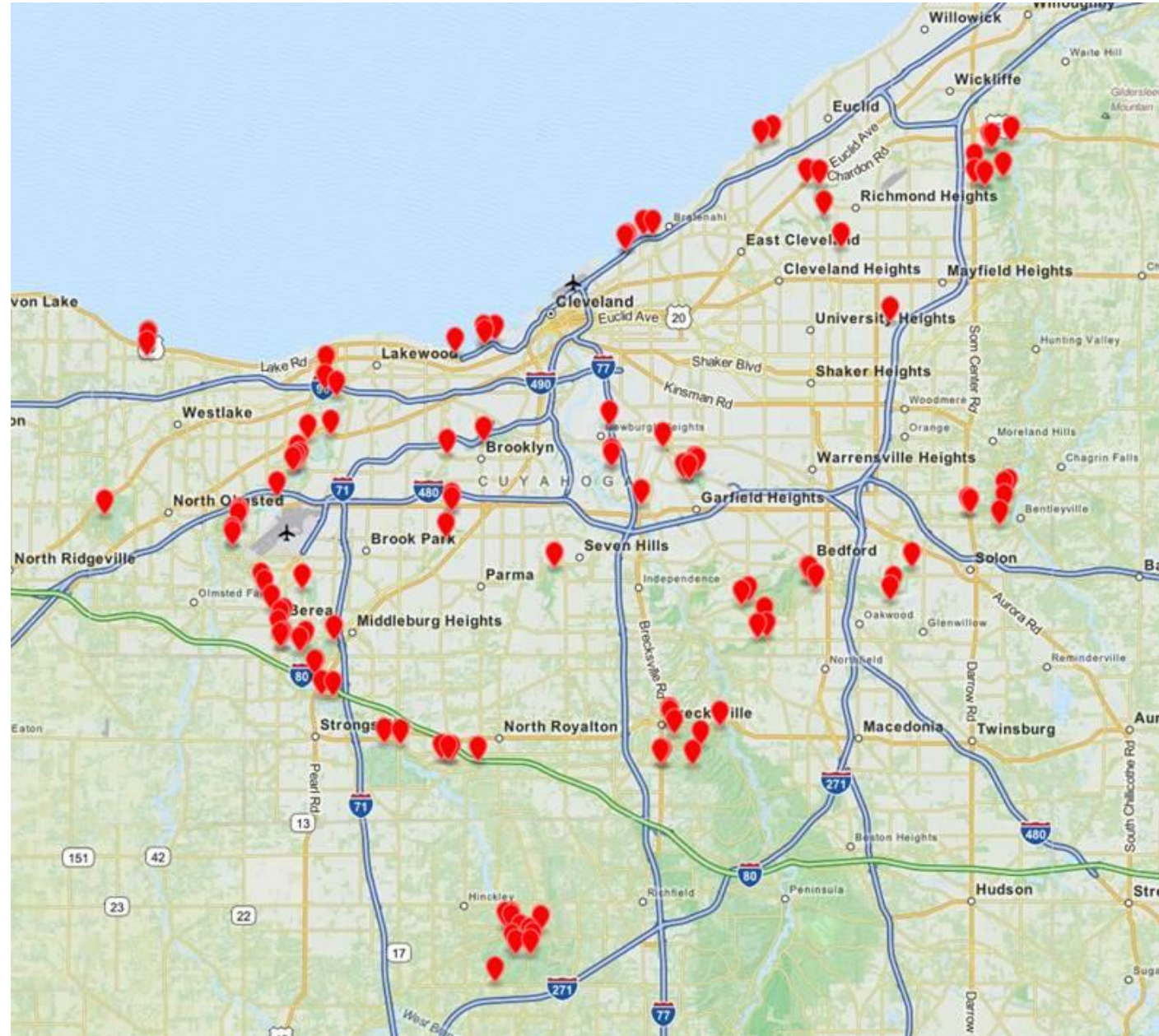
amj1@clevelandmetroparks.com

Counting

- Cars
- People
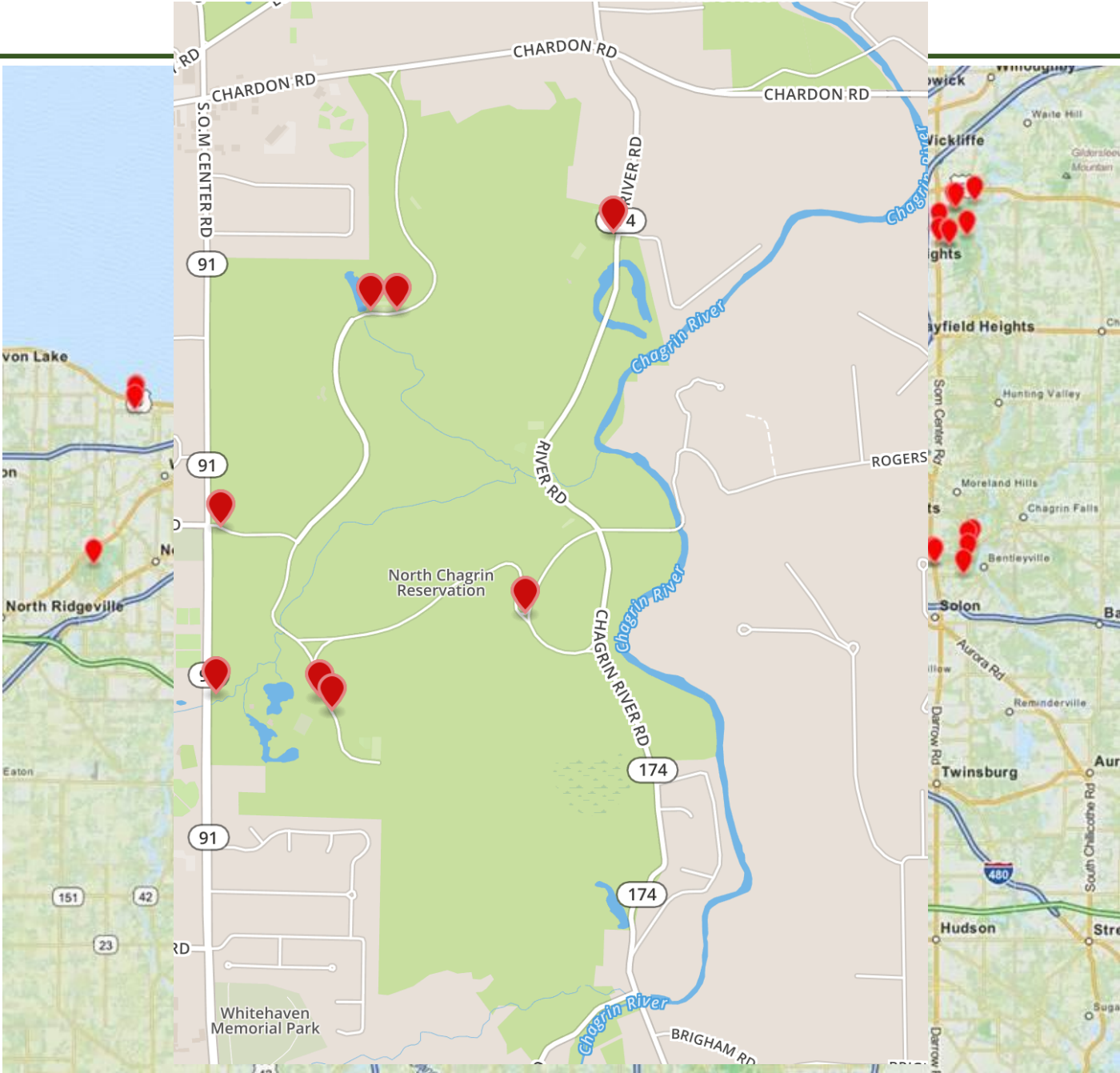- Bikes
- Other
  - Horses
  - Dogs

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Counters

- 130 + counters
  - Largely automobile
- Various analog and digital counters
- Manual counting
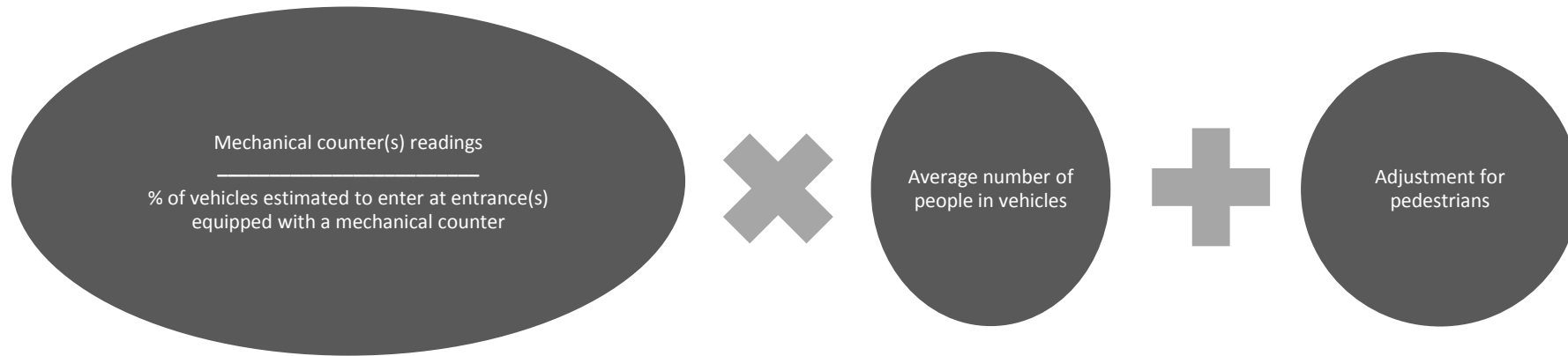- Bluetooth
- Cellular

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Counting Calculation

For each reservation, monthly attendance =

$$\frac{\text{Mechanical counter(s) readings}}{\text{\% of vehicles estimated to enter at entrance(s) equipped with a mechanical counter}} \times (\text{Average number of people in vehicles}) + (\text{Adjustment for pedestrians})$$

Inductive loop traffic counters and/or meter boxes are installed in the locations listed on the next slides; as well as, the weights assigned to each counter, based on the volume seen at each location. Many meters have weights that vary throughout the year, while some have one consistent weight. Visual observations are ongoing in an effort to keep these weights as up to date as possible.

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Types of Sensors

- ## K Hill Traffic Counters
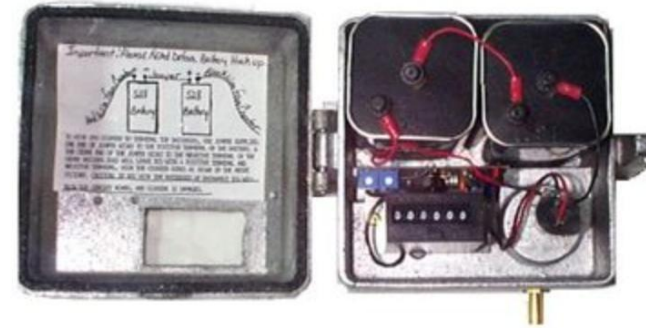
K-Hill Model GMH Air Module Counter
(Available w/ Lexan window or solid cover)

The K-Hill Model GMH Air Module is a portable self contained six digit electromechanical cumulative counter with turnback feature, enclosed in an aluminum weatherproof housing. This counter counts 1.2 half count per axle or one count per automobile. It operates from pneumatic road tube which activates the air module to advance the counter. This counter has the capability to increase or decrease sensitivity or delay to perform for your application. This is the latest in K-Hill's solid state electronics - supplied with two six volt batteries, built in battery tester, and on/off switch. dimensions are 6"x 7"x 5" - weight 12 lbs. Counter comes complete with a vandal proof lock and carrying handle, necessary installation parts and an easy to follow instructions, less road tube. (Must be ordered separately)
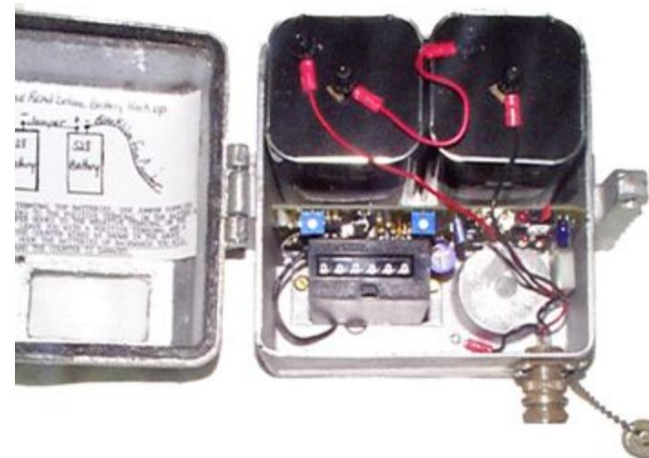
Types of Sensors

- K Hill Traffic Counters
- Trafx Counters

TRAFx Vehicle Counter

No external tubes or wires

TRAFx Trail Counter

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Types of Sensors

- K Hill Traffic Counters
- Trafx Counters
- Eco Counters

TRAFx Ve

No ext

1081 mm (43")

820 mm (32")

Washers are used to adjust the positioning

Ground level

25 mm (1")

310 mm (12")

325 mm (12.5")

Concrete (~20L)

335 mm (13")

0

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Types of Sensors

- K Hill Traffic Counters
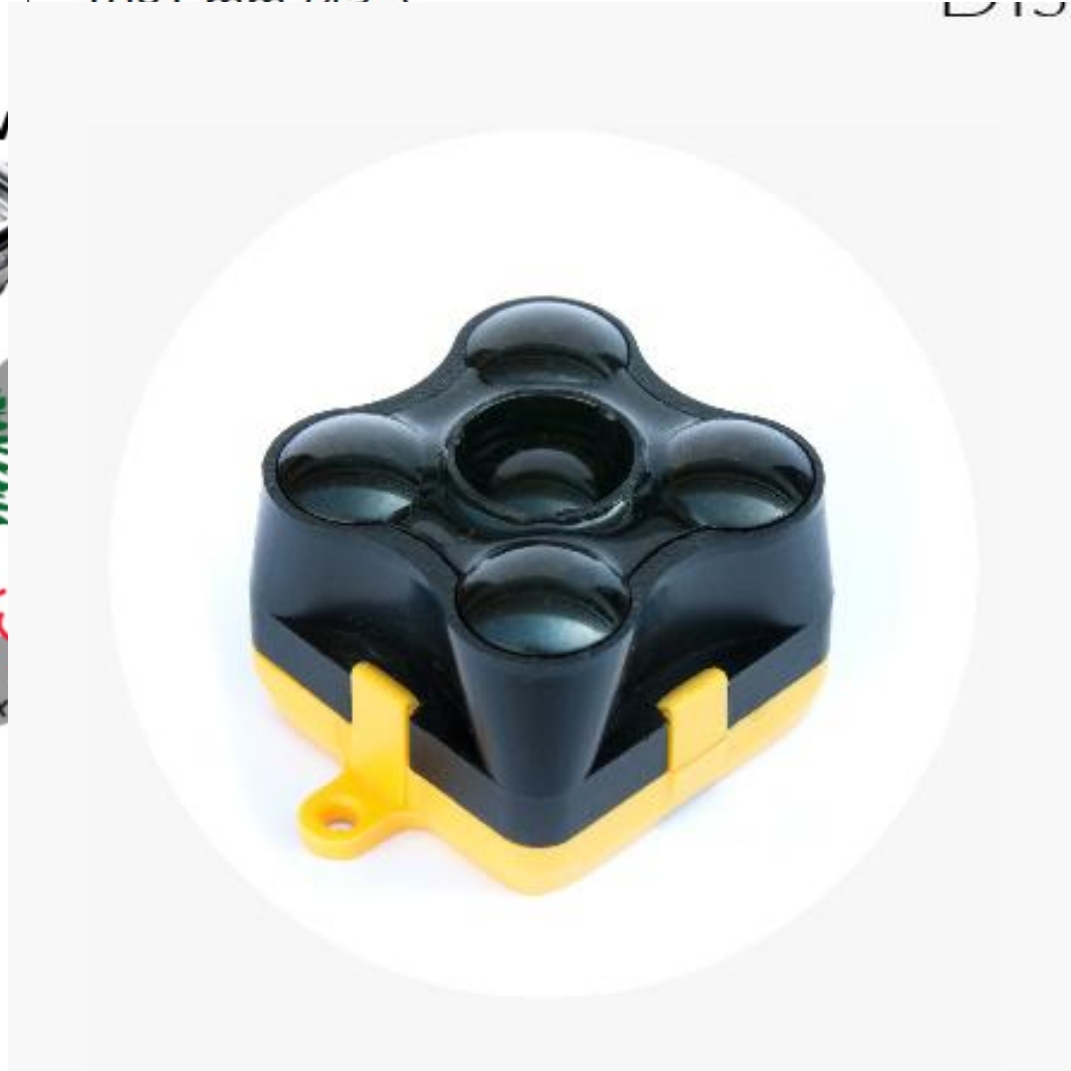- Trafx Counters
- Eco Counters
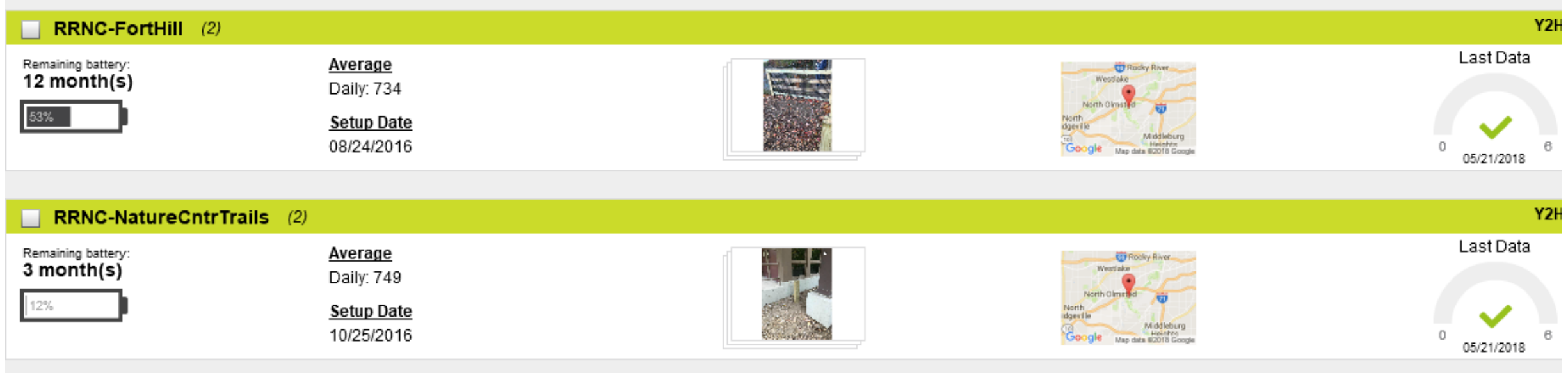- Terabee

TRAFx V

No ex

Installation Example

1081 mm (42")

(12.5")

Reporting

- Built In Cloud Reporting
- Manual Reporting (Research – Marketing)

Reporting

- Built In Cloud Reporting

- Manual Reporting (Research – Marketing)

RRNC-FortHill (2)

Remaining battery:
12 month(s)
53%

Average
Daily: 734

Setup Date
08/24/2016

RRNC-NatureCntrTrails (2)

Remaining battery:
3 month(s)
12%

Average
Daily: 749

Setup Date
10/25/2016

Key Figures

- Total Traffic for the Period Analyzed: 141,853

- Daily Average: 619

 Weekdays: 470 / Weekend days: 995

- Monthly Average: 18,854

- Busiest Day of the Week: Sunday

- Busiest Days of the Period Analyzed:

 1. Sunday, March 18, 2018 (2,472)

 2. Sunday, August 27, 2017 (2,246)

 3. Sunday, August 13, 2017 (2,166)

 • Distribution by Direction:

■ IN: 47%

■ OUT: 53%

47%   53%

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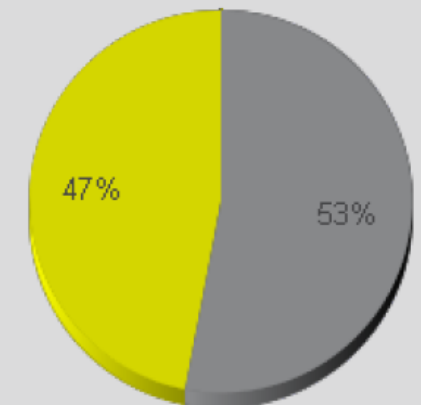
Reporting

- Biking Report
- Infrared Sensors

| Year	Month	OE	Royalview	Bedford
2016	November	441	211	89
2016	December	593	108	49
2017	January	945	83	27
2017	February	655	39	43
2017	March	1673	96	32
2017	April	527	284	57
2017	May	190	130	92
2017	June	1277	830	156
2017	July	3576	892	195
2017	August	206	744	139
2017	September	445	697	159
2017	October	147	385	118
2017	November	215	197	77
2017	December	114	185	38
2018	January	254	90	16
2018	February	87	55	21

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Information on Trails

- Fitness Applications

- Map My Run

- Strava:
  - Ohio Department of Transportation

- CM Mobile Applications (future versions)

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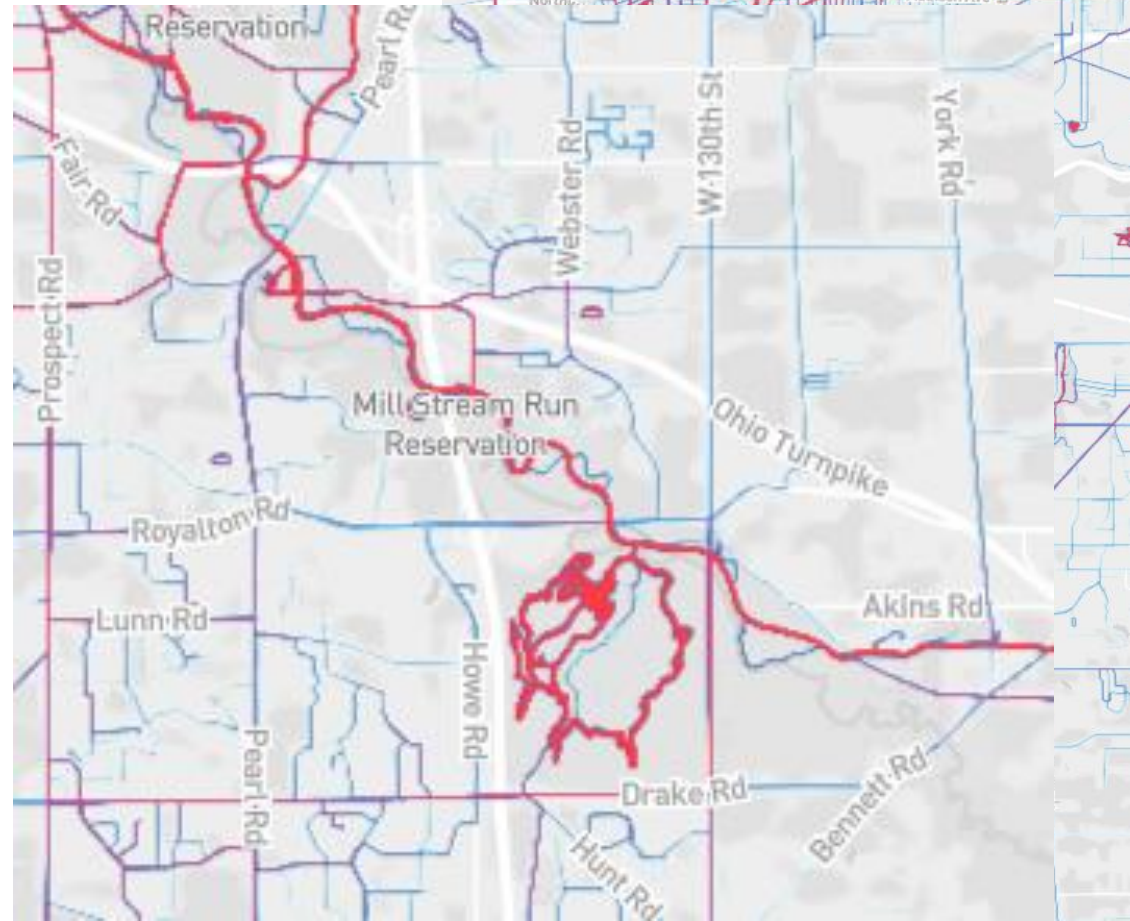# Information on Trails
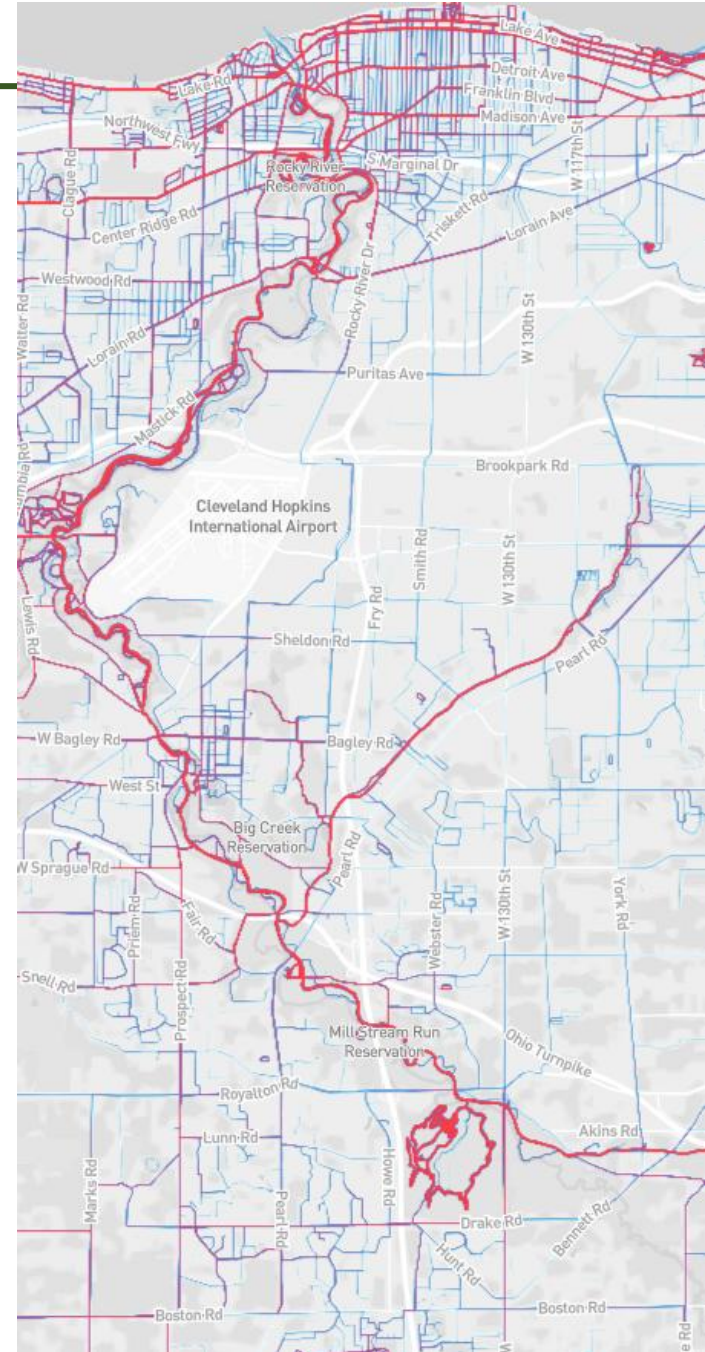
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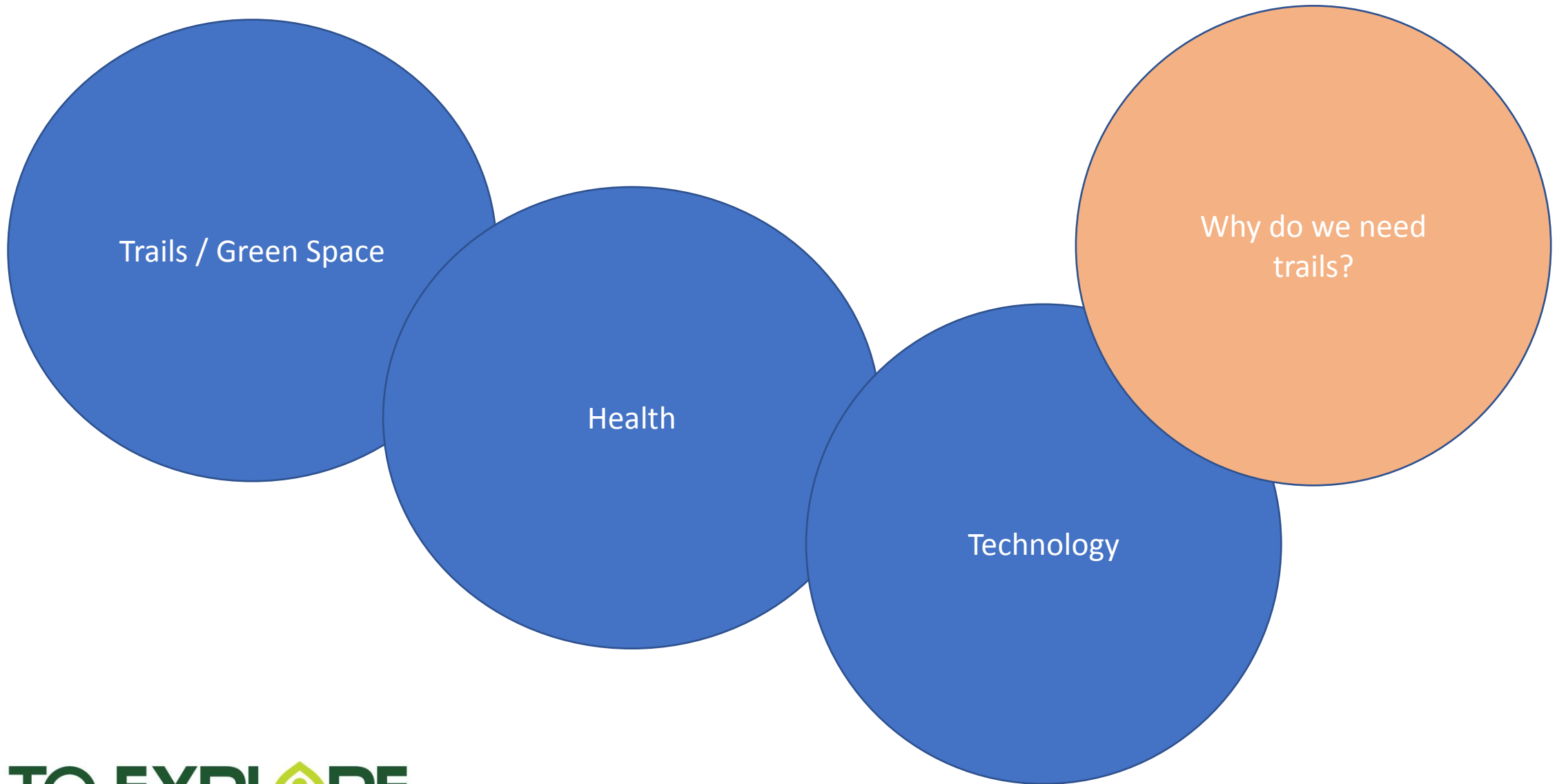- CM Mobile Applications (future versions)

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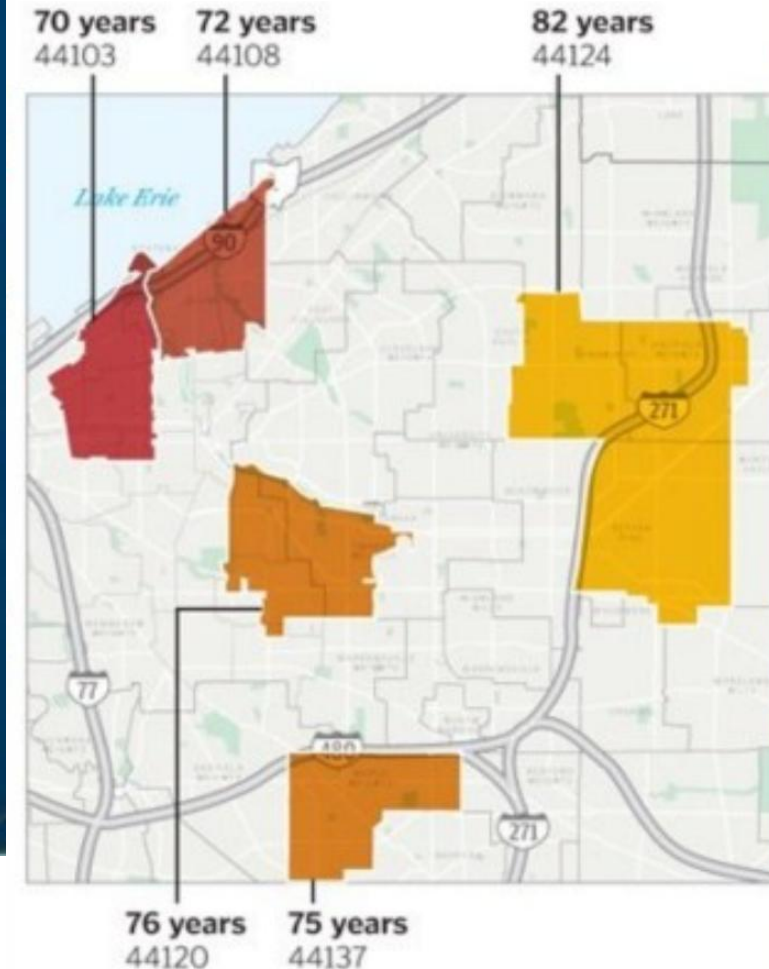Cleveland Metroparks
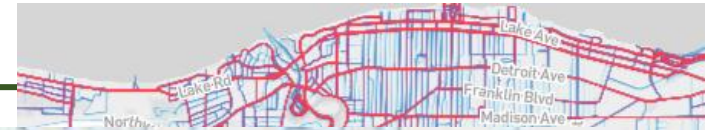
Health Study

Forest Bathing

- Shinrin-yoku
  - Forest Bathing, 1982
- 3 day hike leads to NK (natural killer) cell increase (THIS IS GOOD!) – work to contain viral infections
- Caused by phytoncide (substance emitted by plants and trees) & lower cortisol
- Increases self-esteem, social connection, lowers stress and anxiety

Your zip code can affect your life expectancy

If you travel less than ten miles from Cleveland's northeastern neighborhoods to more affluent eastern outer-ring suburbs, life expectancy can differ by as much as 12 years.

70 years 44103   72 years 44108   82 years 44124

76 years 44120   75 years 44137

SOURCES: Virginia Commonwealth University; Robert Wood Johnson Foundation

THE PLAIN DEALER

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Target

NK

NK cell destroying embryo

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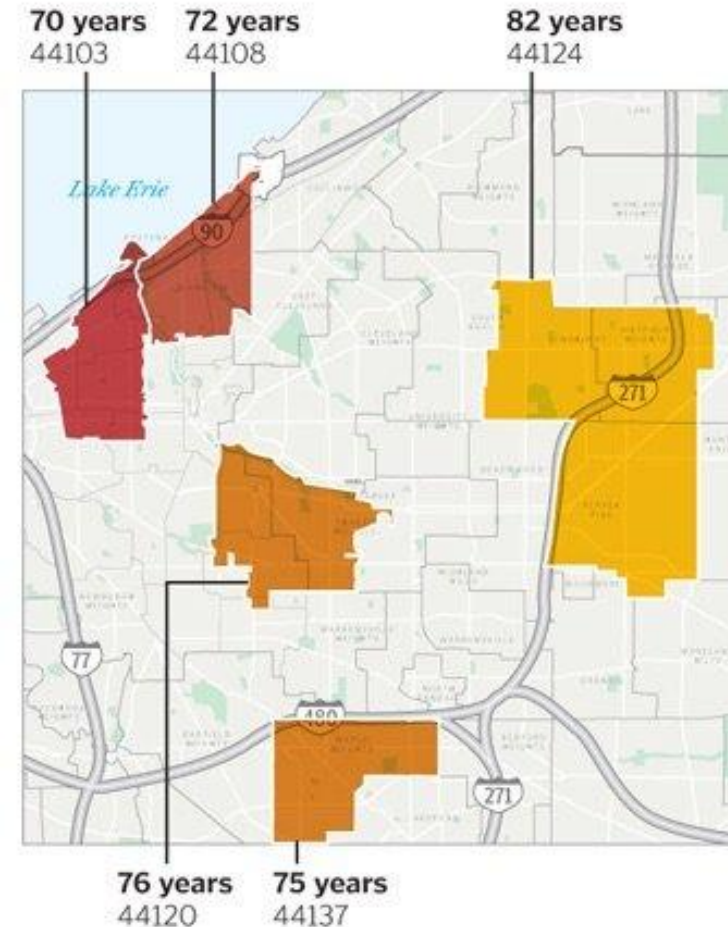- Increases self-esteem, social connection, lowers stress and anxiety

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Lake Erie

| 76 years | 75 years |
| 44120 | 44137 |

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Current Research

- Cleveland Metroparks Health Research Study
  - MetroHealth

- Two groups, four different days
  - Once a week for an hour for 10 weeks
  - Control group in an urban setting

- Measurements
  - Fitbits
  - Blood Pressure
  - Cortisol
  - Air Quality

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Current Research

- Focus Groups (research in progress) – trail selection based on gender, etc.
- All studies are research based – IRB (Institutional Review Board) involving human subjects
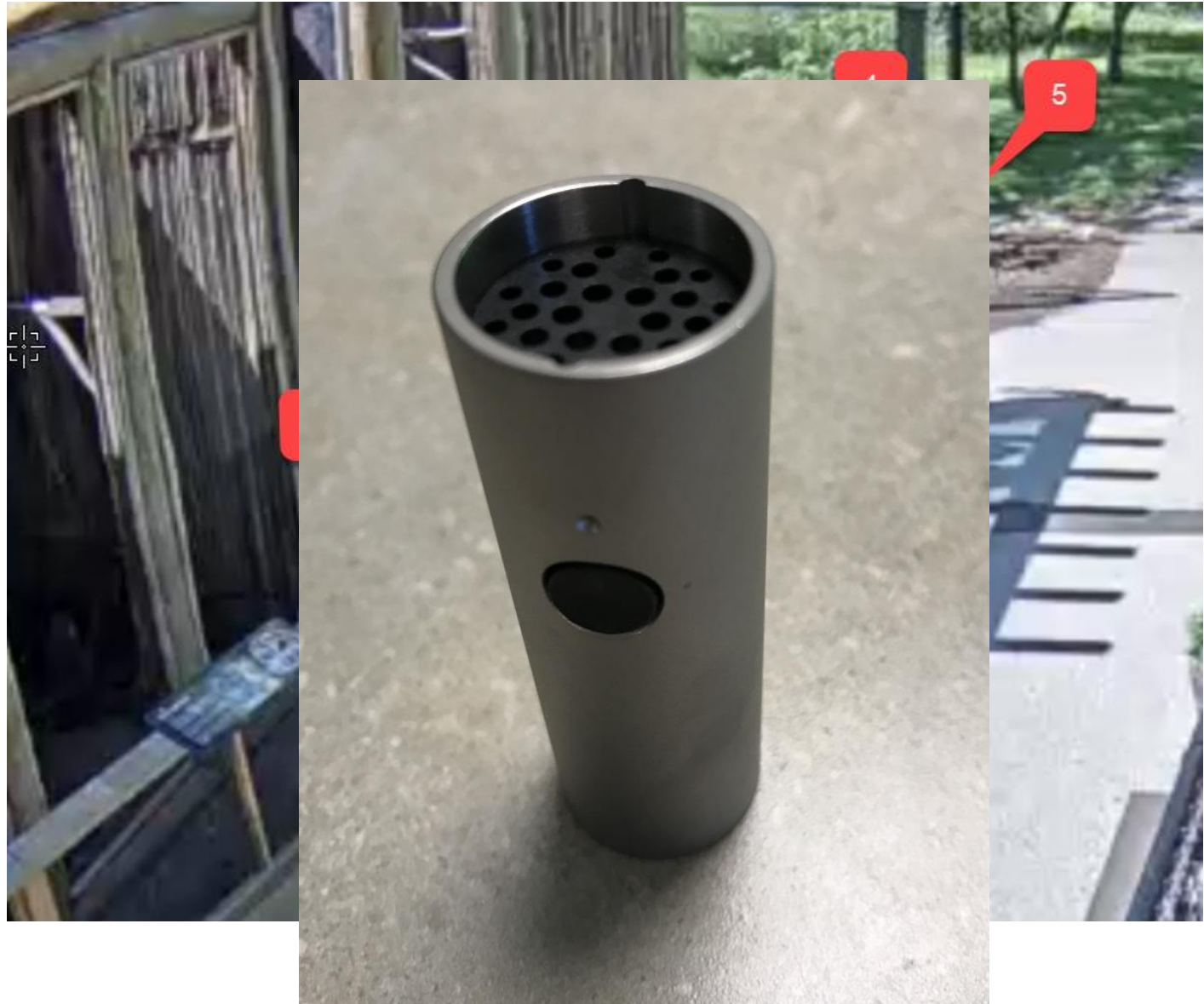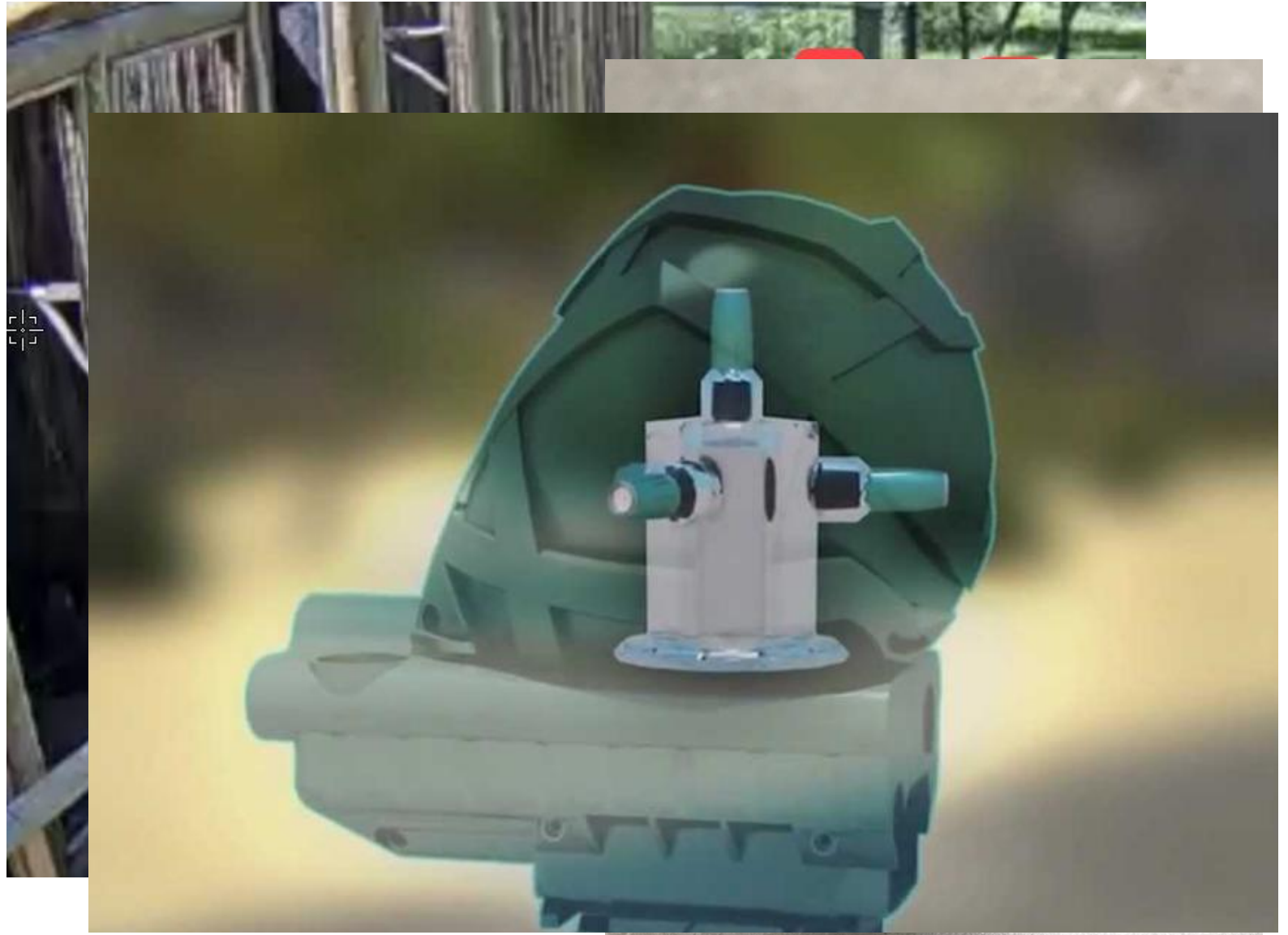- Studies will be published

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Other Types of Technology/Sensors

- Cameras

- Cameras
- Air Quality

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Other Types of Technology/Sensors

- Cameras

- Air Quality

- IoT Sensors
  - Water Monitoring
  - Pavement Monitoring
  - Sound Monitoring
  - Gas/Spray paint Monitoring

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Virtual/Augmented Reality

- Virtual Reality: Wear a headset and walk/view the trails or areas that you do not have or can't access (drone fly overs, etc.)

- Augmented Reality: Headset NOT required but is possible – hologram or artifacts over the real life image you see

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Virtual/Augmented Reality Trail Tours

- ADA

- Planning & Design (bridge)

- Seasonal Changes

- Hospitals (UH Siedman Cancer Institute)

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Summary - Trail Technology

Trying to answer

- Why are trails important?

- When did visitors utilize the trail(s)?

- Where did they visit? Where should we build?

- How should we build?

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