

# TRIECA | 2017 CONFERENCE

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# Low Impact Development (LID) Pilot Projects within the Lake Simcoe Watershed.

Successes and lessons learned from Municipal-Conservation Authority implementation partnerships

TRIECA

March, 2017

Ben Longstaff (LSRCA), Rachel Prudhomme (Town of Newmarket) & Glen McArthur (Town of Aurora)



**Lake Simcoe Region**  
conservation authority



# Rain Scaping

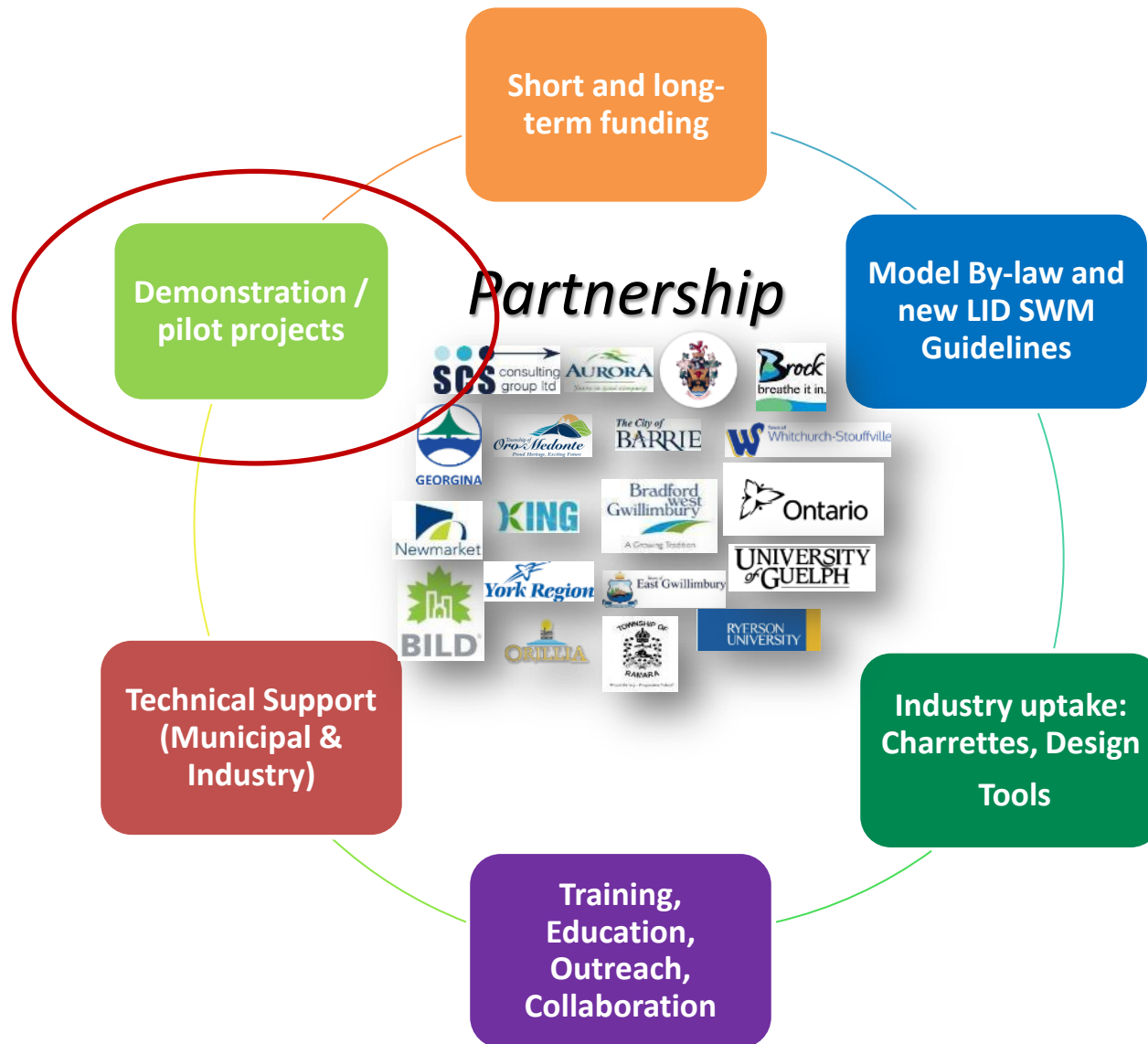
*A market transformation  
program to promote  
Low Impact Development (LID)  
and more sustainable building  
practices.*



# Strategies to effect change



# Strategies to effect change





# Why pilot/demonstration projects?

- Learning exercise
  - LSRCA, municipalities, contractors...
  - Locating opportunities, Cost/budget, time, design, community support, construction issues, reporting etc
- Environmental outcomes
  - Phosphorus and water quantity improvements
- Education and promotion
  - Public, council, municipal staff, dignitaries and other visitors etc



# Municipal Pilot Projects

Municipality	Feature treated	LID installed	Area treated (ha)	P reduction (kg/yr)
Bradford	Town parking Lot	Permeable Pavement/Bioswale	0.29	0.436
Newmarket	Residential Road (Woodland Crt)	Enhanced swale	0.02	0.015
Innisfil	Fire Station parking lot and roof	Infiltration Gallery & cistern	1.05	0.092
Newmarket	Residential Road (Forest Glenn)	Bioswale / biofilters / Raingardens	1.16	
Whitchurch Stouffville	Community Park & parking lot	Permeable asphalt/infiltration galleries/raingardens	0.11	0.0121
East Gwillimbury	Municipal office sidewalk/entrance area	Permeable Pavement/Bioswale	1.11	1.215
Newmarket	Recreation Complex – roof & parking	Dry Swales / Permeable Pavement/Bioretetion		
Aurora	Recreation Complex – roof & parking	Permeable pavement, rain gardens	1.98	3.557
Uxbridge	Recreation Complex – parking	Bioswale	1.67	1.702
Barrie	Recreation Complex – parking	Bioswale - Design phase only	N/A	N/A
Barrie	School play area and parking	Permeable Pavement/Bioswale	TBC	TBC

Majority of incentive funding provide **Environment and Climate Change Canada** – Lake Simcoe/South-eastern Georgian Bay Clean-Up Fund (LSGBCUF)





Fire hall



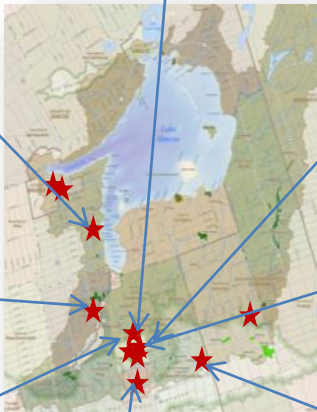
Recreation centre



Office parking lot



Town parking lot



Street



Street



Community centre



Play park





Fire hall



Recreation centre



Office parking lot



Town parking lot



Street



Street



Community centre



Play park

# Town of Newmarket - Forest Glen Rd.

- Whole Street LID retrofit (Bioswale/biofilters/raingardens)
- Residents' engagement needed for project to proceed
- Street meeting with all affected residents prior to decision to proceed (Feb. 2015) - to educate and obtain buy-in
- PPT educational presentation + “pre- & post- renditions”:





# Town of Newmarket – Forest Glen Rd.

- Street BBQ on Saturday lunch time
- Update on design and selection of favourite garden option
- 90% design December 2015
- PIC January, 2016 (90% of residents attended)



# Town of Newmarket – Forest Glen Rd.



- Construction began on May 11, 2016
- Ended Oct. 29, 2016
- Bi-Weekly Newsletter: *“Construction Corner”*
- One engaged resident became point of contact





# Town of Newmarket – Maintenance of LID's



## Winter Maintenance (500 m street):

- 50-50 sand/salt mixes to change to pure salt (+/- \$11K/yr)
- Additional operational costs for separate truck runs
- Will always still get sand

## Other Maintenance:

- Weeding by owners once-twice/yr
- Watering if drought





Fire hall



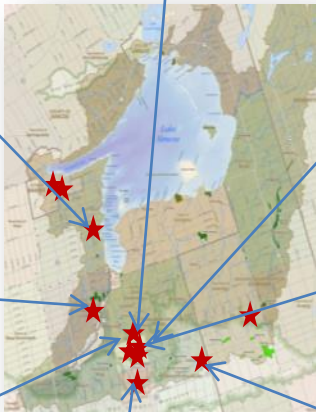
Recreation centre



Office parking lot



Town parking lot



Street



Street



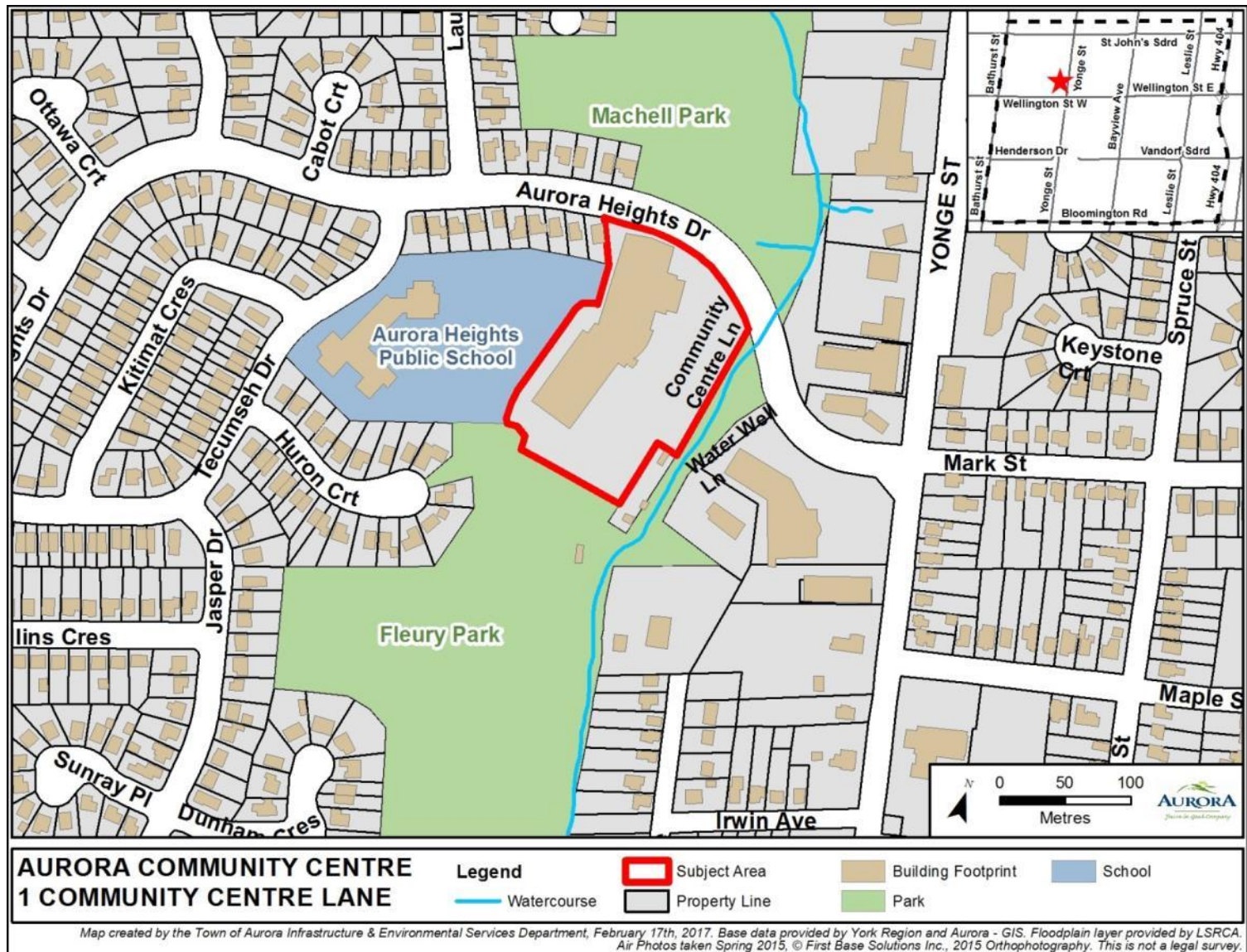
Community centre



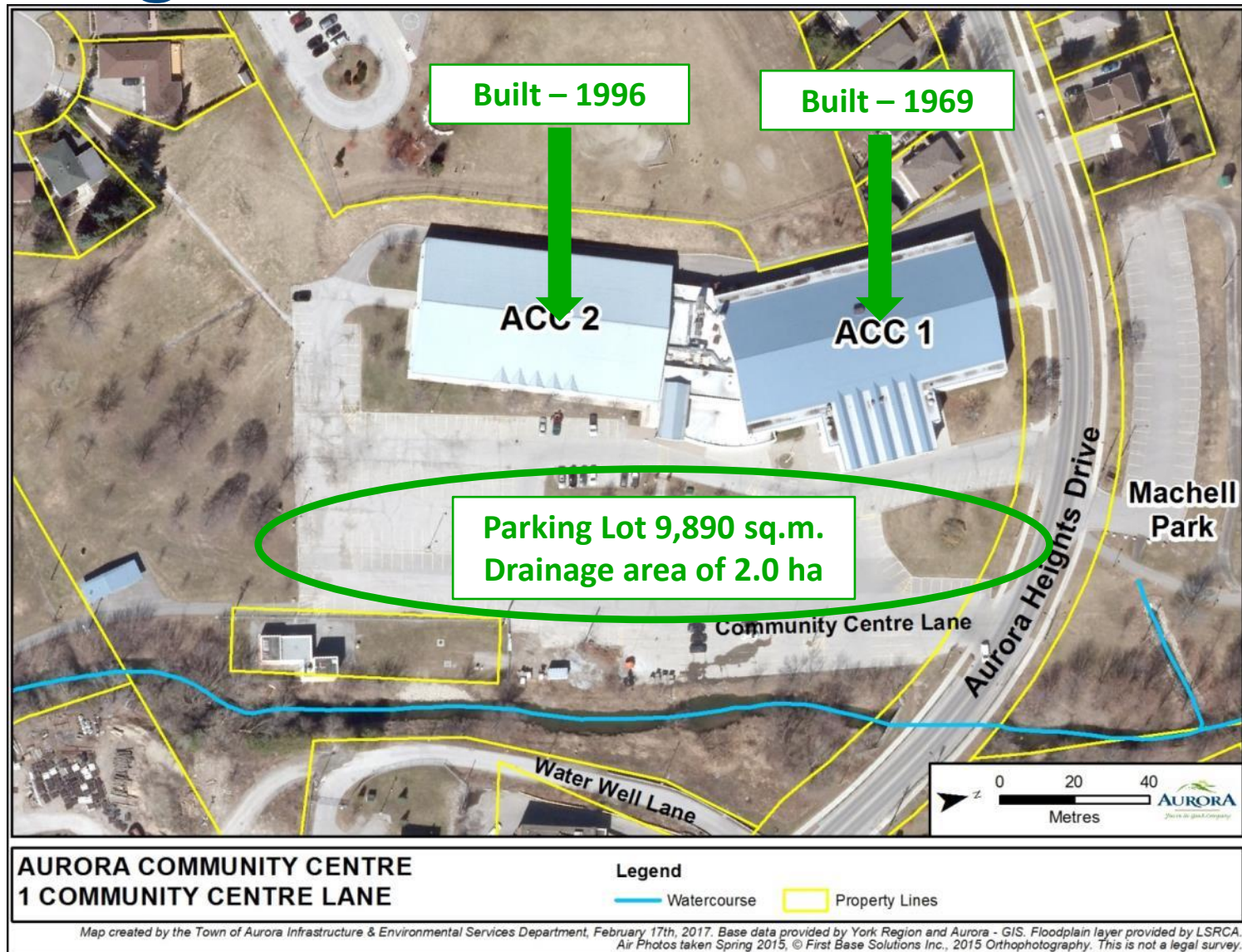
Play park



# Location



# Existing Condition

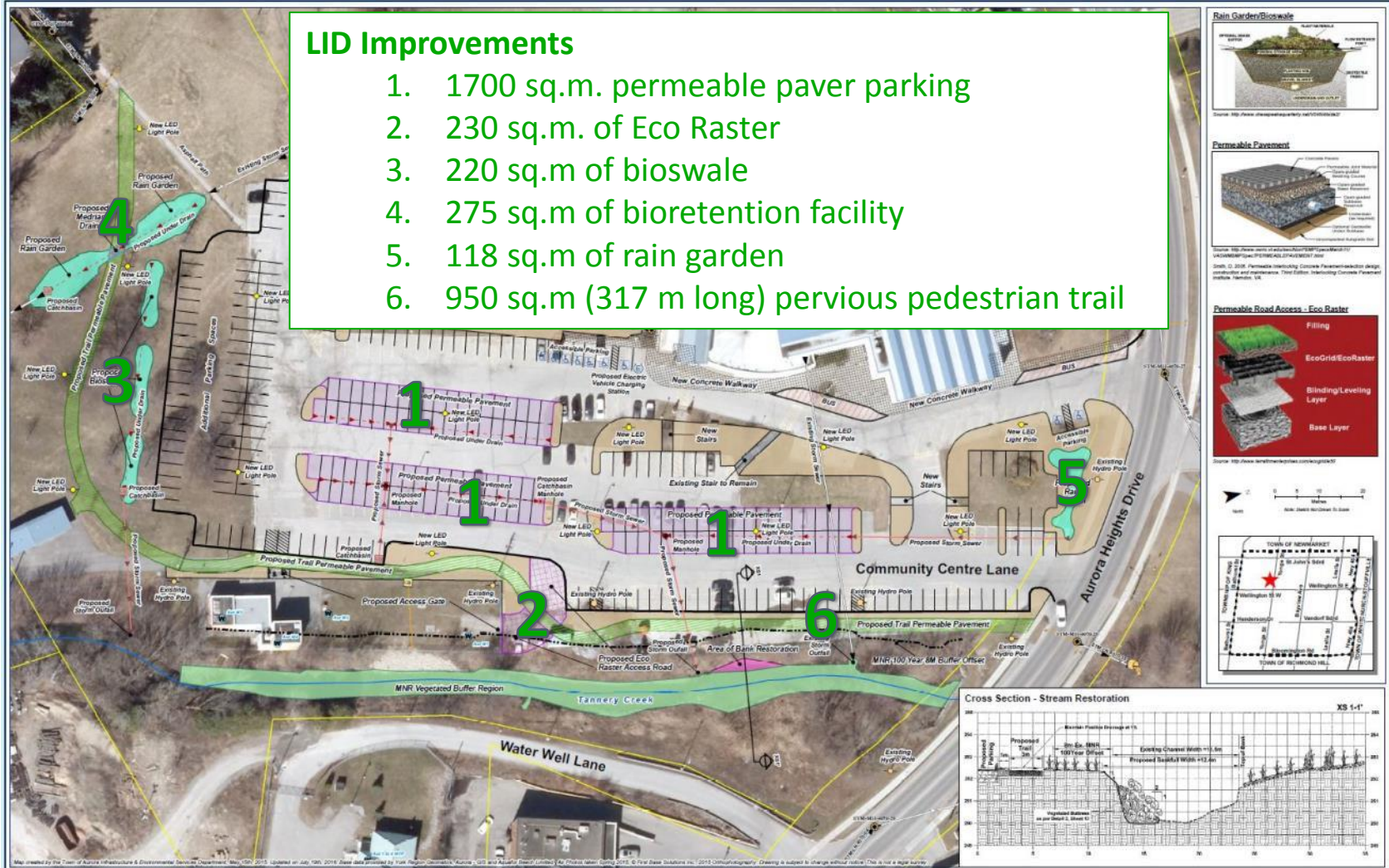




# Improvements

## LID Improvements

1. 1700 sq.m. permeable paver parking
2. 230 sq.m. of Eco Raster
3. 220 sq.m of bioswale
4. 275 sq.m of bioretention facility
5. 118 sq.m of rain garden
6. 950 sq.m (317 m long) pervious pedestrian trail



# Construction

- FRONT RAIN GARDEN





# Construction

- PERMEABLE TRAIL



# Construction

- REAR BIOSWALE





# Construction

- BIO-RETENTION FACILITY



# Construction

- ECO RASTER ACCESS WAY



# Construction

- PERMEABLE PAVER PARKING





# Construction

- PERMEABLE PAVER PARKING

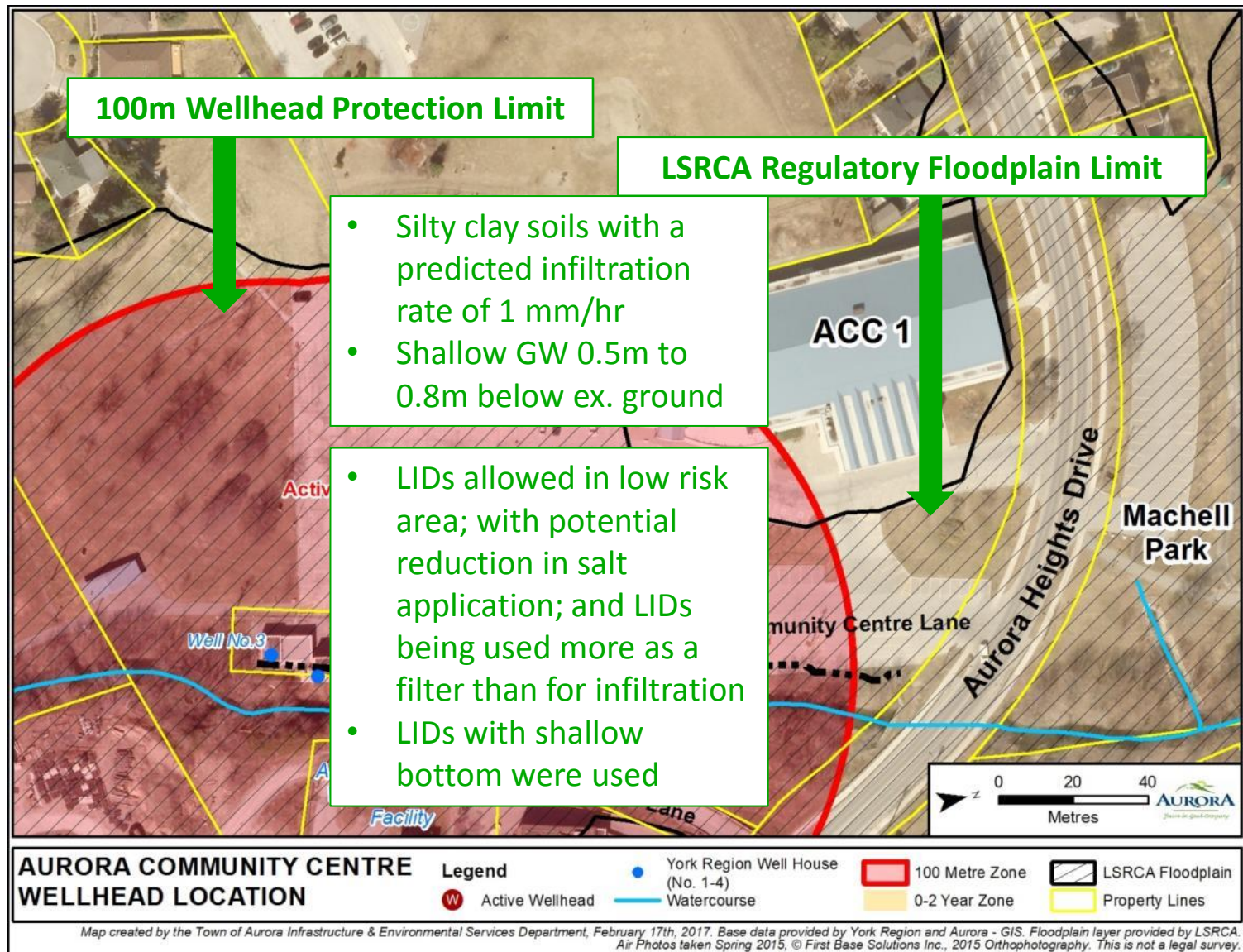




# Lessons Learned

- LIDs that act like filters and are shallow in depth can be installed in locations where assumed impossible

# Lessons Learned





# Lessons Learned

- LIDs can have multiple uses other than just a SWM control such as:
  - Hard surface to walk or drive on
  - Landscape feature to improve aesthetic
  - Acting as a pedestrian and/or vehicle barrier
- The cost of the multiple use of a LID that would need to be installed anyway should be considered in SWM control cost comparisons
- The multiple uses of LIDs can save space
- LIDs improved grading and drainage
- LIDs reduced peak flows, runoff volumes, phosphorus loading and may reduce salt application and runoff temperatures

# Lessons Learned

- When Comparing to asphalt:
  - Permeable Paver Parking Cost 4x more
  - Permeable Paver Trail 2x more
  - Eco Raster Access Way 3x more
  - Permeable Pavers may be equivalent in cost to Impervious Pavers
- LIDs compared to traditional SWM controls increased the project cost by 13%



# Lessons Learned

- Multiple LID types and facilities on one site may increase the project's complexity, due to more:
  - Construction items and specifications
  - Construction staging/phasing
  - Sub-contractors needed and working onsite
- Resulting in more:
  - Contract Administration/Inspection and Communication
  - Learning and rework to meet specifications
  - Time to construct

# Lessons Learned

- Piloting LIDs in busy public locations consider the following if possible:
  - Close the Facility/Site to the public
  - Have a Construction Staging/Methodology Plan prepared before construction
  - Provide contingencies in the construction schedule
  - Communicate well with facility users and operators, to help manage expectations

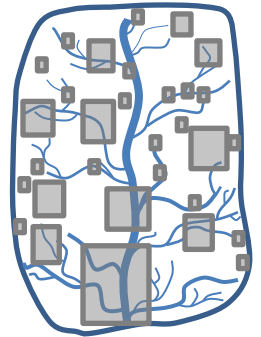


# Some of what we (LSRCA) learned!

- Timing is everything
  - Most success when linked into existing capital project
    - Need to work with municipal staff early as possible in budget cycle
- No simple incentive formula
  - Level of support varied greatly between projects
  - Some projects failed to eventuate due to insufficient financial support (even at 75%)
- Impossible to predict contractor ability/knowledge
  - Some projects very smooth and quick, others constant issues:→ Continuous LID focused construction monitoring required.
  - Contractor training essential moving forward

# Moving beyond pilot projects...

- Significant sustained funding needed:
  - Phosphorus and quantity offsetting
  - Utility Fees
- Need to apply economic principles and analysis for widespread uptake
  - Aggregation and economies of scale
  - Presentations tomorrow - Track 1: 2pm and 3pm
- Catchment/watershed based decision support tools to guide: where, when, what types of GI/LID
- Demonstrate that we are making a difference



# Collaboration has been key to our successes *Rain Scaping*

## Conservation Authorities



## Stormwater working group





# Acknowledgements

## Funding:

- **Environment and Climate Change Canada** – Lake Simcoe/South-eastern Georgian Bay Clean-Up Fund (LSGBCUF)
- **Lake Simcoe Conservation Foundation**
- **Lake Simcoe municipalities**



Environment and  
Climate Change Canada



Lake Simcoe  
Conservation  
Foundation

## LSRCA staff

- Steve Auger, Christa Sharp, Mike Walters, Phil Davies, Brian Kemp, Andee Pelan, Katleya Young-Chin