Building Resilient Communities
One Code at a Time
RAE-TCS Summit
December 10-15, 2016
The Great Lakes Coastal Storms Program seeks to provide resources to Great Lakes communities to help them plan and implement mitigation strategies to reduce the impacts of these coastal storm hazards.
Top Hazards

1) Bluff and shoreline erosion (67%)

2) Stormwater/agricultural runoff pollution (62%)

3) Stormwater/agricultural runoff sedimentation (60%)

4) Overflow of combined sewer and stormwater systems (57%)

5) Residential and commercial stormwater flooding of residential and commercial developments (55%)
Top Planning Needs

1) Updated 100/500-year flood maps (80%)

2) Local ordinance, zoning and building code assessment and analysis maps (79%)

3) Shoreline erosion mapping and predictions (69%)

4) Public communication of risks and disaster response (69%)

5) Predictions about public health impacts (66%)
Advancing Green Infrastructure through Code Revision
Hallelujah!
Hallelujah!
If the code language is not clear that green infrastructure is an acceptable or preferred approach to managing stormwater, green infrastructure will not likely be considered in development proposals, design plans or capital projects.
What makes this audit unique?
<table>
<thead>
<tr>
<th>GI practice</th>
<th>GI practice</th>
<th>GI practice</th>
<th>GI practice</th>
<th>Limitations or prohibitive language, but could potentially be approved</th>
<th>GI practice prohibited or prevented by conflicting code</th>
</tr>
</thead>
<tbody>
<tr>
<td>clearly allowed and approved as-of-right</td>
<td>allowable but some ambiguity or potential conflict</td>
<td>allowed with discretionary approval</td>
<td>mentioned but w/o standards or guidance</td>
<td>No policy or standards adopted, but not disallowed</td>
<td>prohibited or prevented by conflicting code</td>
</tr>
</tbody>
</table>

Nuanced Code Ranking
## Permeable Materials

<table>
<thead>
<tr>
<th>Question</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>May alleys be permeable or widths varied?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are parking areas allowed to be permeable?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are loading areas allowed/encouraged to be permeable?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are sidewalks allowed/encouraged to be permeable?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are driveways allowed/encouraged to be permeable?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are low-volume street sections allowed/encouraged to be permeable?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does the use of permeable materials reduce the stormwater quantity required to be managed? Is so is this a written or informal standard?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there a provision that driveways may/shall be partially permeable or drained to pervious area if exceeding a certain width/total SF?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is permeable surfacing allowed for parking lanes?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Must driveway aprons be made of impermeable surfaces?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Must a sealant be used and can that provision be waived?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Can grasscrete be used to meet public safety/fire access needs?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is there municipal experience with permeable material, curbless streets, or other GI measures?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are standard specifications or performance standard adopted or referenced for permeable materials?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Code Revision: Allow use of permeable surfacing in driveways and alleys

(3) Surfacing. All driveways shall be surfaced with an asphaltic or Portland cement pavement in accordance with village standards and specifications so as to provide a durable and dust-free surface, and shall be so graded and drained as to dispose of all surface water. Permeable surfacing may be used upon review and approval by the village engineer.
What’s the Impact:
Permeable Alleyways

63% runoff volume reduction

63% total suspended solids reduction
Code Revision: Encouraging use of bioretention areas with curb cut inlets as parking lot landscaping

24.12.020 Perimeter Vehicular Use Area Landscaping and

24.12.030 Interior Vehicular Use Area Landscaping

The integration of depressed bioretention areas used for landscaping and stormwater management is strongly encouraged. Where perimeter areas are designed specifically for stormwater management, the planting and dimensional requirements of 24.12.020(B)(1) above may be varied as necessary to ensure that the area functions effectively for stormwater treatment, so long as in the judgment of the [plan commission, city engineer] an equivalent amount of landscaping, planting or screening is provided.
What’s the Impact:
New Standards For Parking Lot Landscaping

46% runoff volume reduction
59% total suspended solids reduction
TACKLING BARRIERS TO
Green Infrastructure

AN AUDIT OF MUNICIPAL
CODES AND ORDINANCES
Reduce impervious surfaces and maximize vegetated/landscaped areas
Disconnect effective impervious areas
Restore and protect natural functions of soils and vegetation
Control pollution from specific sources
Clarify the intent and purpose of codes to encourage green infrastructure use
How to Audit Municipal Codes and Ordinances

1. Community Scoping

2. Audit Community’s Codes and Ordinances (Audit Tool)

3. Prioritize Recommendations and Develop a Strategy for Adoption
COMMUNITY SCOPING WORKSHEET

Community Planning

1. Has a comprehensive plan been adopted for the community?
   □ Yes   □ No

   If yes, how are the community’s natural resources addressed in the comprehensive plan?

   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________

2. Is there specific attention to the community’s water resources in the comprehensive plan?
   □ Yes   □ No

   If yes, is green infrastructure implementation listed as a key element in the watershed restoration implementation plan?
   □ Yes   □ No

3. Has your municipality taken part in the development of a watershed restoration or other similar plan?
   □ Yes   □ No

Natural Assets

1. Are there rivers or streams flowing through your community?
   □ Yes   □ No

   How aware are residents of these resources? ________________

2. Are there private or public properties within your community that have frontage on a lake, pond or river?
   □ Yes   □ No

3. Are there other important natural areas adjacent or within your community?
   □ Yes   □ No

   If yes, how are those natural areas incorporated into the community’s culture, such as for events?

   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
Natural Assets?
Hazards?
Community Identity and Character?
Green Infrastructure Usage?
Acceptance?
Step 2: Audit Community’s Codes and Ordinances
✓ ARCHITECTURAL DESIGN STANDARDS
✓ COASTAL COMMUNITIES
✓ COMMUNITY OUTREACH AND EDUCATION
✓ CONSTRUCTION AND POST-CONSTRUCTION MANAGEMENT
✓ LANDSCAPING
✓ PARKING
✓ PERMEABLE MATERIALS
✓ POLLUTANT REDUCTION THROUGH SITE PLAN REVIEW
✓ POST-CONSTRUCTION STORMWATER STANDARDS AND LONG-TERM MAINTENANCE
✓ PUBLIC WORKS STANDARDS
✓ PURPOSE STATEMENTS AND COMMUNITY PLANS
✓ SANITARY AND STORM SEWER DISCONNECTIONS
✓ STORMWATER MANAGEMENT STANDARDS
✓ SUBDIVISIONS AND NEW “GREENFIELD” DEVELOPMENT
✓ ZONING
<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>Practice is enabled and described specifically; clearly allowed and approved as-of-right</td>
</tr>
<tr>
<td>A</td>
<td>Practice is specifically allowable/as-of-right approval, but some ambiguity or potential conflict</td>
</tr>
<tr>
<td>A−</td>
<td>Practice is enabled or encouraged, with discretionary approval</td>
</tr>
<tr>
<td>B</td>
<td>Practice is mentioned but without standards or guidance for use</td>
</tr>
<tr>
<td>C</td>
<td>No policy or standards adopted, but not disallowed</td>
</tr>
<tr>
<td>D</td>
<td>Limitations or prohibitive language in the code, but could potentially be approved</td>
</tr>
<tr>
<td>F</td>
<td>Practice prohibited by code language, or an active conflict would prevent approval</td>
</tr>
<tr>
<td>Audit Question</td>
<td>Type of Barrier</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Is the use of deep-rooted or native plants, plants with habitat value, or edibles allowed or encouraged in the landscaping standards?</td>
<td>Landscape standards</td>
</tr>
</tbody>
</table>
Step 3: Prioritize Recommendations
Development pressures?
No Near-term Development or Redevelopment?
Stormwater Permits?

TMDLs?
Flooding or CSO issues?
Next Steps

www.seagrant.wisc.edu/greeninfrastructure
Thank You!

NOAA Great Lakes Coastal Storms Program
FOSTERING COMMUNITY RESILIENCE TO COASTAL STORMS
Questions?

LAST YEAR WE BEGAN TO COLLECT RAIN WATER...THERE'S A HECK OF A LOT OF IT OUT THERE.

Julia Noordyk
NOAA Great Lakes Coastal Storms Program Outreach Coordinator
University of Wisconsin Sea Grant Institute
noordykj@uwgb.edu

www.seagrant.wisc.edu/greeninfrastructure