

Sustainable Infrastructure

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+ Values

- Grit
- Determination
- Hope
- Innocence



3



Values

The framework for community identity



Photo by: amy hess

+ Value: Resilience

- To adapt
- To evolve
- To incorporate new technology
- To incorporate new advancements

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+ Value: To Thrive

- Through good times
- Through tough times
- For a long time

+ Value: Leverage every dollar to achieve more value

- Nobody has money to waste
- Need every investment to create
 - Economic value
 - Community value
 - Environmental value

+ 1. Integration

It takes more effort

- We're trained in silos and implement in silos

It creates more value

- Every move builds on the last



+ 2. Broader alternatives

- Are we LEAVING MONEY ON THE TABLE because of we don't look broadly enough at alternatives?
- Can we GET MORE VALUE per dollar spent?

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+ 2. Broader alternatives

Assemble a team of “T-shaped” individuals as advisors

- Experts in each field who are also naturally open to new ideas
 - 5% of any silo
 - Busiest people around

Have them review and critique projects before they are submitted for budgeting

- Help project managers to explore new alternatives
- Help identify plausible new technologies
- Get specific about risk and risk cost



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+ POWER Engineering

Home | Boilers | Coal | Gas | Renewables | Nuclear | Onsite Power | O&M | Emissions | Business

Home | The Nature Conservancy and CH2M HILL Team Up in Groundbreaking Effort to Integrate Natural and Conventional Infrastructure

The Nature Conservancy and CH2M HILL Team Up in Groundbreaking Effort to Integrate Natural and Conventional Infrastructure

09/16/2014

ARLINGTON, VA—(Marketwire - Sep 16, 2014) - CH2M HILL and The Nature Conservancy announced a new five-year collaboration to bring innovative and integrated engineering and environmental solutions into the global marketplace.

"The planet faces powerful systemic challenges that together, we are well-positioned to address," said Kacky Andrews, Director of Conservation Programs North America at The Nature Conservancy. "Both natural ecosystems and human-made infrastructure, require creative new solutions to address the intertwined and increasing challenges of a rising and urbanizing population, overtaxed natural resources and a changing climate."

"Evaluating the capabilities and benefits of natural infrastructure -- such as reefs, wetlands and urban green spaces -- alongside built structures, such as breakwaters, seawalls and levees -- can offer engineers, planners and communities the broadest possible menu of options in any given place," said Elisa Speranza, CH2M HILL's executive sponsor for the collaboration. "It's all about achieving the most efficient, flexible and cost-effective blend of solutions for communities."

ft.comnet.com/home/1191948291954/Right/ItemWeb/ItemWeb_PE_xL1/FLSM_PE_S51_130218.grf.html/77736376456537466413443454626e





+3. Scale

- Blend old and new with nested semi-autonomous
 - Buildings
 - Neighborhoods
 - Cities

+

Luckily, a we can get better at this through

1. training
2. pre-design workshops,
3. technical assistance,
- and 4. loans directed toward sustainable infrastructure plans and projects

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Questions/Comments?

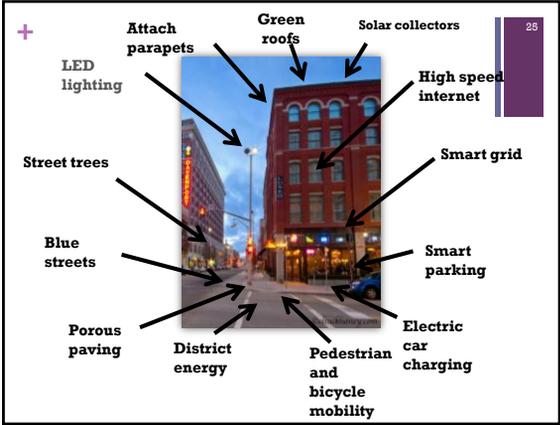
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Thank you!

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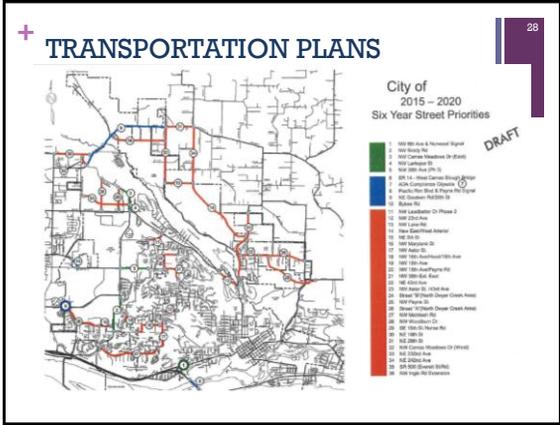
How do our existing cities adapt to change?



DECISION-MAKER'S CRITERIA WHEN EVALUATING PLANS AND PROJECTS

1. Will it be the same or better levels of service for the same or less cost?
2. Are we maximizing value for the whole community?
3. Did we
 - Compare technologies across silos?
 - Compare labor vs. capital?
 - Centralized vs. decentralized?
4. Are we increasing our capacity to adapt to all kinds of change?

Other examples



TRANSPORTATION PLANS

- How can we get most value for the spending we must do?
 - Can transportation improvements also
 - Enhance internet connectivity?
 - Increase open space?
 - Facilitate district energy systems?
 - Create more jobs?
 - Increase flood capacity?



+ OPEN SPACE PLANS 31

- Can open space plans also
 - Provide flood storage capacity?
 - Hazard recovery zones?
 - Provide urban food gardens?
 - Facilitate district energy systems?
 - Link with affordable housing developments?

+ WHAT DOES IT LOOK LIKE? 32

NEW BUILDINGS AND REDEVELOPMENT

- Use renewable resources
 - Sun
 - Rain
 - Soils
 - Food
 - Shade
 - Vegetation
 - Wind
 - Evaporation
- Close loops
 - Air to air heat exchangers
 - Geo-exchange heat/cool
- Smart systems
 - Real time monitoring
 - Feedback loops





+ WHAT DOES IT LOOK LIKE? 33

NEIGHBORHOODS

- Link together green semi-autonomous buildings
 - Feedback loops
- District energy using renewable energy/water
 - Local Food/Farmer's markets
 - Integrate stormwater plantings
 - Design places that people love and will care for over time
- Install smart systems
 - Sun
 - Rain
 - Soils
 - Shade
 - Vegetation
 - Real time monitoring



+ “The United States should design infrastructure investments in service of the next economy, not the current or prior one.” 34

KKR May 2014

10/1/14

UTILITY PLANS

N/NE 80th Street Feeder Main Rehab

Problem:
From a 1994 Study on water feeder mains, this project was identified as a high priority pipe for rehabilitation due to the number and frequency of leaks from ongoing failures at the joints. The project proposed to slipline (insert smaller pipe into the existing one) approximately 9,000 linear feet of existing pipe on N/NE 80th Street at a cost of about \$4 million.

Seattle Public Utilities

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UTILITY PLANS

N/NE 80th Street Feeder Main Rehab

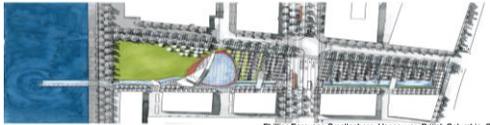
New Solution:
Although the historical number of leaks on this pipeline was high (26), the frequency was actually fairly low (approx. 1 per year). The business case analyzed the continued cost of repairs – about \$20,000 per year – versus the annualized cost of rehabilitation. The economics showed that it was far more cost effective to spend \$20k per year on repairs than move forward with a \$4M construction project. The analysis was conducted on a triple bottom line basis, wherein impacts to customers of the annual leak repair and the impact to customers of the rehabilitation project were taken into consideration. This is a case where the status quo option was recommended, where in the past, we may have replaced the asset before the optimal economic life was attained.

Seattle Public Utilities

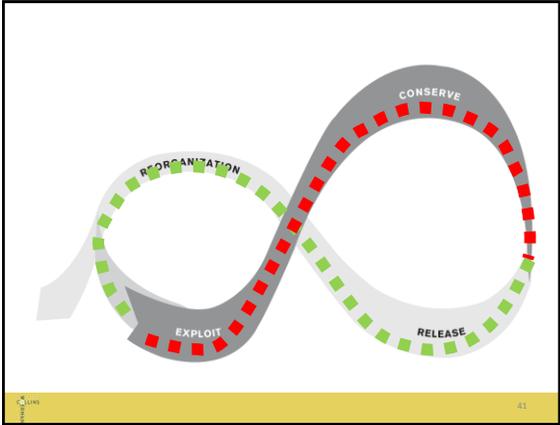
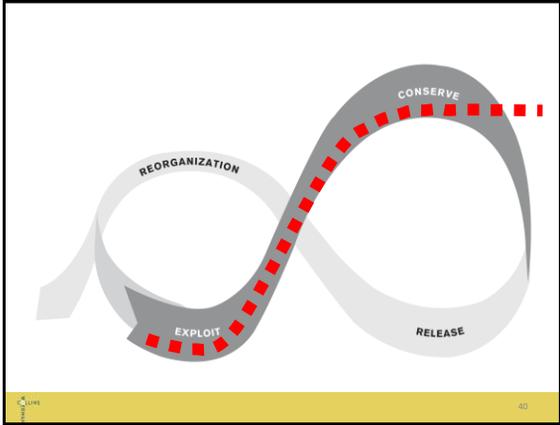
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SHERBOURNE COMMON, TORONTO

- Stormwater control
- Stormwater treatment
- Park

Philips Farevaag Smallerberg, Vancouver, British Columbia, Canada



IMPLEMENTATION OF SUSTAINABLE INFRASTRUCTURE

Manage all public urban lands as integrated land holding that

- Provides mobility
- Open space
- Recreation
- Habitat
- Aesthetic beauty

Use asset management and triple bottom line accounting to compare alternatives

