Sustainable CIP Planning

Maximizing return on infrastructure investments to create resilient communities

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Agenda

- Challenge facing cities today
- Overview of Sustainable Return on Investment (SROI) Analysis
- Using SROI to connect CIP efforts with citywide strategic initiatives
Key Question Facing Cities Today

How can a city continue to address increasing infrastructure and amenity demands with limited resources?
Prioritizing Wants and Needs

**WANTS**
- Image of people jogging on a path surrounded by greenery.

**NEEDS**
- Image of a street scene with a dilapidated house and overgrown areas.
- Image of a construction site with a large pipe and gravel.
- Image of a map with green fields and a building.
Strategies for Closing the Gap

1) Identify and implement small, low-cost projects that can be used to improve quality of life in neighborhoods and activate unused spaces

2) Prioritize maintenance projects that will have maximum impact on property values, tax base and walkability

3) Prioritize and scope major infrastructure projects/investments to address big issues related to long-term community resilience (fiscal/environmental/social)

4) New development must be done in a more fiscally productive and environmentally sensitive pattern.
VERDUNITY

Bringing perspectives together

COMMUNITY
Where and how we work

VERDUNITY
Strong Neighborhoods
Locally-Led Initiatives
Partnerships

VERDE
What inspires us

Fiscally Productive Places
Natural Systems and LID
Economic Gardening

A Better Future, by Design.
SROI/Economic Applications

- Comprehensive Plans
- Park/Open Space Plans
- Stormwater Management and Watershed Master Plans
- Neighborhood Revitalization Projects
- Capital Improvement Program Development
Economics Capacity as a Differentiator
Calculating Triple Bottom Line Returns and Valuing Public Benefits
How to Communicate Your Value?

- BCA: Benefit Cost Analysis
- LCCA: Life Cycle Cost Analysis
- SROI: Sustainable Return on Investment
Tools that are available to YOU

- SROI Framework (public domain)
- Business Case Evaluators (public domain)
- AutoCASE (subscription to cloud based automated technology)
- Economists in a Box (relying on extensions of staff tied to software that users build mastery of over time)
- TBL Specialists/Consultants/Customization of Software
Why Use These Analytics?

These assessments are essential as infrastructure and public building projects are created for one reason. Is it:

A. Because we like to build big stuff?
B. Because airports, wastewater plants and bridges are huge money makers?
C. Because policy makers win votes through planning processes?
D. Because there are public costs of not taking action and benefits of delivering carefully planned projects?
Merit-Based Approaches

- Best-value procurements are becoming total-value, not just least-cost
- Federal Executive Orders
- Federal grant funding programs are merit-based
- Quantitative decision making
Defining Optimal Projects

- Understanding total returns leads to better design decisions
- Client demand for economic assessment
  - Expensive and time consuming
- Fine-tune through project stages
  - Feasibility/funding
  - Planning
  - Design
- Solutions?
What AutoCASE Does?

- Quantifies
- Automates
- Optimizes
AutoCASE has two main goals

1. Standardize Triple Bottom Line Analysis
2. Prioritize Projects
Total Value Assessment – Details
Triple Bottom Line Assessment

- Monetary valuation of triple bottom line using CBA
- Proven method in multiple contexts
- Applicable for program, project-level decisions
- Accounts for risk and uncertainty
CBA is a tool to aid agencies in project selection and prioritization:

- It considers the gains and losses to all members of the society on whose behalf the CBA is being undertaken
- It values impacts in terms of a single, familiar measurement scale – money
- The money values used to weight the relative importance of the different impacts
- Determine whether the benefits of a proposed action justify its costs
Triple Bottom Line Framework

Project's Cash Impacts
- Capital (complete LCC)
- Operations & Maintenance

Internal Non-Cash Benefits
- Resiliency
- Health & Safety
- Mobility

External Costs & Benefits
- Greenhouse Gases
- Clean Air Containment
- Water & Solid Waste

LCCA or FROI

FROI + Internal

SROI
Monetizing Social & Environmental Impacts

Ecosystem Valuation Techniques

- Market Price Method
- Productivity Method
- Hedonic Pricing Method
- Travel Cost Method
- Damage Cost Avoided, Replacement or Substitute Cost
- Contingent Valuation Method
- Contingent Choice Method
- Benefit Transfer Method
Valuation Research
Case Studies
SROI and TIGER Grants

- Four of II’s senior professionals were directly involved in HDR’s extremely successful TIGER program from inception all the way to TIGER VII
- Developed Excel-based models to calculate the public benefits for projects and provided quality control on the quantitative part of the projects
- Participated in assisting nearly 30 TIGER grant awardees who together have received $625 million in federal funds
<table>
<thead>
<tr>
<th>Benefit Number</th>
<th>Net Benefit</th>
<th>Impact Category</th>
<th>Discounted Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reduced Cost of Train Delay at Current Capacity</td>
<td>Transportation System Savings</td>
<td>$11</td>
</tr>
<tr>
<td>2</td>
<td>Reduced Transportation Costs from Displacing Heavy Truck Travel</td>
<td>Transportation System Savings</td>
<td>$580</td>
</tr>
<tr>
<td>3</td>
<td>Change in Inventory Costs from Displacing Heavy Truck Travel</td>
<td>Transportation System Savings</td>
<td>-$48</td>
</tr>
<tr>
<td>4</td>
<td>Change in Inventory Costs from Reduced Train Delay</td>
<td>Transportation System Savings</td>
<td>$6.6</td>
</tr>
<tr>
<td>5</td>
<td>Savings From Reduced Highway Congestion</td>
<td>Transportation System Savings</td>
<td>$16.4</td>
</tr>
<tr>
<td>6</td>
<td>Reduction in Maintenance Costs from Displacing Heavy Truck Travel</td>
<td>Transportation System Maintenance</td>
<td>$85</td>
</tr>
<tr>
<td>7</td>
<td>Environmental Savings from Displacing Heavy Truck Travel</td>
<td>Environmental Improvements</td>
<td>$31</td>
</tr>
<tr>
<td>8</td>
<td>Environmental Savings from Reduced Train Delay (Idling)</td>
<td>Environmental Improvements</td>
<td>$.2</td>
</tr>
<tr>
<td>9</td>
<td>Reduced Accident Costs from Displacing Heavy Truck Travel</td>
<td>Transportation Safety</td>
<td>$96</td>
</tr>
<tr>
<td>10</td>
<td>Aid in Case of Massive Natural Disaster Relief / Terrorist Attack</td>
<td>Emergency Relief</td>
<td>$4.1</td>
</tr>
<tr>
<td></td>
<td>Total Discounted Value of Net Benefits (Note: Separate calculations, may not add)</td>
<td></td>
<td>$782</td>
</tr>
</tbody>
</table>
National Mall Stormwater

A project proposal by Albert H. Small & National Coalition to Save Our Mall

Mall area in 2006

Used for storm water/flood management during large events
Washington D.C., National Mall

National Mall Underground Case Study
Based on Preliminary Estimates
Ford Site – BARR and Nelson Nygaard

- 135 acres along the Mississippi River in Saint Paul, MN
- Develop a livable, mixed use neighbourhood with clean technologies, high quality design for energy, buildings and infrastructure
- Variety of technical assessments: jobs/employment; energy; transportation; stormwater; real estate, etc.
- Various sources of funding for technical analysis: City of Saint Paul, McKnight Foundation, US EPA, etc.

Assess broader economic, social, & environmental impacts and communicate the value of sustainable design to inform zoning and public realm planning:

- Stormwater Site Design Alternatives Analysis – BARR Engineering
- Multi-Modal Transportation Site Development Alternatives Analysis – Nelson Nygaard
Stormwater Site Design

- Assessed the trade-offs of an activity-centric design alternative with a higher concentration of green stormwater features and centralized recreation space
- Proved the business case of incorporating a higher concentration of green stormwater features in support of creating a connected, livable, and green site
- Social and environmental benefits including improved water quality, enhanced recreational opportunities, and flood risk reduction
- A comprehensive characterization of value for each stormwater scenario

Baseline

Centralized
TBL Assessment Outcomes

Baseline (+$6.3 million) 0.4 benefit-to-cost ratio

Hidden Falls Headwaters (+18.9 million) 0.9 benefit-to-cost ratio
The benefit-to-cost ratio for the Hidden Falls Headwaters alternative is twice that of the Baseline alternative.

Significant estimated benefits make ROI for Hidden Falls Headwaters more attractive.

- Green infrastructure/ecosystem services
- Enhanced public spaces and recreation
- Connection to Hidden Falls Park
- Restoration of Hidden Falls Creek
- More awareness, users & uses
Multi-Modal Transportation

- Multi-modal transportation analysis using SROI cost-benefit framework to prioritize design alternatives
- Roughly 42,000 additional AADT
- Possible alternatives in the transportation master planning include transit investments, new roadway alignments, signalling, complete streets, traffic calming measures, recreational areas and pedestrian and bike pathways
- Assess economic, social, & environmental impacts and benefits such as: time savings, reduced emissions, accident avoidance, congestion reduction, active transportation health benefits, recreational values, amenity values streetscape improvements, flood risk reduction, heat mortality risk reduction
LADWP Green Infrastructure – CH2M

**Context**
Multi-agency interest in Green Infrastructure

**Question**
How can various agencies plan GI projects strategically?

**Hypothesis**
New modeling workflows can provide decision support

**This Study**
CH2M piloted workflow on an LADWP site
LADWP Pilot Study

- East Valley District Yard
- 3 Scenarios
- Goal: assess benefits of individual and multiple BMPs
- Compare the various strategies
- Design Scenarios optimized – Hybrid
### Hybrid Scenario - Results

<table>
<thead>
<tr>
<th>Cost/Benefit Category</th>
<th>Scenario 1</th>
<th>Scenario 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property Value</td>
<td>$46,574</td>
<td>$11,104</td>
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<tr>
<td>Flood Risk</td>
<td>$296,159</td>
<td>$248,637</td>
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<tr>
<td>Air Pollution by Vegetation</td>
<td>$527</td>
<td>$527</td>
</tr>
<tr>
<td>Heat Island Effect</td>
<td>$2,357</td>
<td>$9,898</td>
</tr>
<tr>
<td>Shadow Wage</td>
<td>$4,474</td>
<td>$3,785</td>
</tr>
<tr>
<td>Carbon Emissions by Vegetation</td>
<td>$32</td>
<td>$32</td>
</tr>
<tr>
<td>Water Quality</td>
<td>$343,087</td>
<td>$346,521</td>
</tr>
<tr>
<td>Value of Increased Groundwater</td>
<td>$68,277</td>
<td>$69,583</td>
</tr>
<tr>
<td>Reduced MWD Water Costs</td>
<td>$41,994</td>
<td>$42,798</td>
</tr>
<tr>
<td>Reduced O&amp;M on Additional Detention</td>
<td>$3,736</td>
<td>$4,657</td>
</tr>
<tr>
<td>Reduced O&amp;M on Additional Piping</td>
<td>$5,609</td>
<td>$4,484</td>
</tr>
<tr>
<td>Energy Savings</td>
<td>-$</td>
<td>-$</td>
</tr>
<tr>
<td>Replacement Costs</td>
<td>$(153,829)</td>
<td>$(148,103)</td>
</tr>
<tr>
<td>Operations and Maintenance</td>
<td>$(238,275)</td>
<td>$(227,017)</td>
</tr>
<tr>
<td>Capital Expenditure</td>
<td>$(353,783)</td>
<td>$(293,979)</td>
</tr>
<tr>
<td>Life-Cycle Cost Analysis</td>
<td>$(745,887)</td>
<td>$(669,099)</td>
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<tr>
<td>FROI Net Present Value</td>
<td>$(694,547)</td>
<td>$(617,160)</td>
</tr>
<tr>
<td>SROI Net Present Value</td>
<td>$66,939</td>
<td>$72,927</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scenario 1</th>
<th>Scenario 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>$761,487</td>
<td>$690,087</td>
</tr>
<tr>
<td>$51,339</td>
<td>$51,939</td>
</tr>
<tr>
<td>$(745,887)</td>
<td>$(669,099)</td>
</tr>
</tbody>
</table>

Discounted Costs and Benefits

FROI: Future Return on Investment
SROI: Simple Return on Investment
Los Angeles World Airports (LAWA) is re-examining their major utilities serving Los Angeles International Airport (LAX)

We helped LAWA with 6 separate utility projects, analyzing 17 various alternatives in total. Utility projects included:

- Domestic Water
- Fire Water
- Sanitary Sewage Electricity
- Chilled & Heated Water Capacity
- Chilled & Heated Water Distribution
Provided a comprehensive lifecycle economic analysis by providing the following analyses:

- Financial analysis
- SROI analysis

Our approach was to designate Alternative 1 as the “base case” for each project, and compare each subsequent alternative to the “base case”.

Valued risks/uncertainty; reliability; greenhouse gases; criteria air contaminants; water impacts
Economic Returns as a Differentiator

- Project funding and decisions becoming increasingly merit-based
- Total value assessments provide better insights into projects - social and environmental impacts can be valued
- Fine-tune and prioritize projects
- Automated tools becoming available and more widely utilized
- Produces recommendations which are transparent and defensible – and brings value to your clients
- Provides decision makers and staff with a precise and disciplined medium of communication
Sustainable Return on Investment (SROI) Analysis Applications

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Applications in Fort Worth

1) Evaluating and aligning public and private investment for development
   TRVA Panther Island Project Case Study

2) Tying capital improvement project prioritization to the City’s strategic goals and comprehensive plan
   Stormwater Management Program

3) Refining the scope and evaluating design options for stormwater infrastructure projects
   Central Arlington Heights Neighborhood/Stormwater Improvements
Aligning Public and Private Investment

Panther Island
Aligning Public and Private Investment

Panther Island

Public Infrastructure Project for Flood Protection and Access

Potential Private Investment as a Result
Aligning Public and Private Investment

Casting a vision for LID implementation
Primary Questions

1) What is the economic case for additional initial investment in low impact development?

2) What is the return on investment for:
   a) the City
   b) the developer
   c) the region?
Traditional Design

- No green infrastructure
- Water quality addressed structurally
Aligning Public and Private Investment

LID alternative cost/benefit evaluation

**Traditional Design**

**Right-of-Way Option**

- Bioretention to replace all street trees
Aligning Public and Private Investment

LID alternative cost/benefit evaluation

- Traditional Design
- Right-of-Way Option
- Open Space Option
  - Bioretention along canals and open spaces
  - Allows for drainage directly to canals
Aligning Public and Private Investment

LID alternative cost/benefit evaluation

- Traditional Design
- Right-of-Way Option
- Open Space Option
- **Architectural Option**
  - Private implementation of green roofs
  - Assumes 25% green roof coverage
Aligning Public and Private Investment

LID alternative cost/benefit evaluation

Capital Cost Comparison in millions of dollars

<table>
<thead>
<tr>
<th>Total Cost in Millions of Dollars</th>
<th>Green Infrastructure Cost</th>
<th>Probable Construction Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional</td>
<td>$2.2</td>
<td>• 8-Yr construction period</td>
</tr>
<tr>
<td>$8.2</td>
<td></td>
<td>• 50-Yr operational period</td>
</tr>
<tr>
<td>ROW</td>
<td>$1.8</td>
<td>O&amp;M Costs</td>
</tr>
<tr>
<td>$8.0</td>
<td>$1.1</td>
<td>• Typical costs from EPA</td>
</tr>
<tr>
<td>Open Space</td>
<td>$3.8</td>
<td></td>
</tr>
<tr>
<td>$9.4</td>
<td>$1.1</td>
<td></td>
</tr>
<tr>
<td>Architectural</td>
<td>$3.8</td>
<td></td>
</tr>
<tr>
<td>$9.2</td>
<td>$1.1</td>
<td></td>
</tr>
</tbody>
</table>

Costs Evaluated
Aligning Public and Private Investment

LID alternative cost/benefit evaluation

**Economic Benefits**

**Sales Tax**
- Estimated 2-4% Increase
- Base values from Economic and Fiscal Impacts of the Corps of Engineers’ Trinity River Vision Project (UNT 2005)
- Conservative estimate based on prior studies

**Property Values**
- Estimated 3.36% Increase based on 10,500 residential units with an average value of $150-160k
Environmental and Social Benefits

Water Quality Improvements
- Based largely on Willingness-To-Pay studies conducted by USACE and others

CO₂ and Air Pollution Reduction
- Based on US Forest Service estimates for pollutant removal
Aligning Public and Private Investment

LID alternative cost/benefit evaluation

Example inputs and analysis results

<table>
<thead>
<tr>
<th>Capital Expenditure</th>
<th>Traditional</th>
<th>Right-of-Way Response</th>
<th>Open Space Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rain Gardens</td>
<td>$0</td>
<td>$1,376,250</td>
<td>$2,935,944</td>
</tr>
<tr>
<td>Hydrodynamic Structures</td>
<td>$1,700,000</td>
<td>$850,000</td>
<td>$850,000</td>
</tr>
<tr>
<td>Grey Components</td>
<td>$6,511,000</td>
<td>$5,768,504</td>
<td>$5,631,056</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$8,211,000</strong></td>
<td><strong>$7,994,754</strong></td>
<td><strong>$9,417,000</strong></td>
</tr>
</tbody>
</table>

Funding Information

- **Primary Entity Served**: Municipality
- **Taxes**: 15%
- **Grants/Donations**: 5%
- **Equity**: 30%
- **Nominal Rate of Return for Equity**: 10%
- **Debt**: 50%
- **Debt Financing Term Length**: 30 years
- **Rate of Interest for Debt Financing**: 4%
- **Weighted Average Cost of Capital**: 4.7%
### Aligning Public and Private Investment

#### LID alternative cost/benefit evaluation

**Example inputs and analysis results**

<table>
<thead>
<tr>
<th></th>
<th>Right-of-Way Response</th>
<th>Open Space Response</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Costs:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capital</td>
<td>($216,246)</td>
<td>$1,206,000</td>
</tr>
<tr>
<td>Operations and</td>
<td>$202,412</td>
<td>$442,325</td>
</tr>
<tr>
<td>Maintenance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>($13,834)</td>
<td>$1,648,325</td>
</tr>
<tr>
<td><strong>Benefits:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State/Local Sales</td>
<td>$290,383</td>
<td>$580,767</td>
</tr>
<tr>
<td>Tax</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water Quality</td>
<td>$298,665</td>
<td>$371,184</td>
</tr>
<tr>
<td>Residential Property</td>
<td>$2,919,612</td>
<td>$5,717,190</td>
</tr>
<tr>
<td>Tax (City/County)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO2 Emissions</td>
<td>-</td>
<td>$142,858</td>
</tr>
<tr>
<td>Air Pollution</td>
<td>-</td>
<td>$199,981</td>
</tr>
<tr>
<td>Total</td>
<td>$3,460,785</td>
<td>$7,011,980</td>
</tr>
<tr>
<td><strong>Net (Benefits - Cost):</strong></td>
<td>$3,474,619</td>
<td>$5,363,655</td>
</tr>
</tbody>
</table>
The Right-of-Way and Open Space options both showed positive returns over the Traditional approach.
# Project Prioritization

## Aligning projects with citywide strategies

<table>
<thead>
<tr>
<th>CRITERIA – PROJECT DRIVERS</th>
<th>DESCRIPTION</th>
<th>AutoCASE Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>D1 – Regulatory Risk</td>
<td>• Complies with Current &amp; Pending Legal or Regulatory Requirements</td>
<td>• Regulatory Penalties</td>
</tr>
<tr>
<td></td>
<td>• Mitigate Hazards to Life, Health and Safety</td>
<td>• Other Costs</td>
</tr>
<tr>
<td>D2 - Capacity</td>
<td>• Meet Increase in Demand for Service</td>
<td>• Operations &amp; Maintenance</td>
</tr>
<tr>
<td></td>
<td>• Expands Service Areas</td>
<td>• Revenues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Recreational Value</td>
</tr>
<tr>
<td>D3 – Capital Replacement</td>
<td>• Refurbishment, Renewal or In-Kind Replacement of Buildings, Infrastructure and Equipment to Ensure Reliability and Continuity of Service Levels</td>
<td>• Replacement Costs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Operations &amp; Maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Decommissioning</td>
</tr>
<tr>
<td>D4 - Efficiency/Sustainability</td>
<td>• Improvements in Cost Effectiveness</td>
<td>• Water Costs</td>
</tr>
<tr>
<td></td>
<td>• Improvements in Revenue</td>
<td>• Operations &amp; Maintenance</td>
</tr>
<tr>
<td></td>
<td>• Improvements in Operational Performance</td>
<td>• Revenues</td>
</tr>
<tr>
<td></td>
<td>• Improvements in Productivity</td>
<td>• Air Pollution</td>
</tr>
<tr>
<td></td>
<td>• Improvements in Resource Management</td>
<td>• Property Value Uplift</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Other Benefits</td>
</tr>
</tbody>
</table>
## Project Prioritization

### Aligning projects with citywide strategies

<table>
<thead>
<tr>
<th>CRITERIA – STRATEGIC OBJECTIVES</th>
<th>DESCRIPTION</th>
<th>AutoCASE Metrics</th>
</tr>
</thead>
</table>
| S1 – Safest City                 | • Crime Suppression  
• Fire Protection  
• Emergency Preparedness  
• Code Compliance  
• Traffic Management  
• Public Health | • Flood Risk Mitigation  
• Heat Island Effect  
• Air Pollution  
• Carbon Emissions  
• Recreational Value  
• Water Quality Uplift  
• Accident Impacts*  
• Streetscape Impacts*  
• Mobility Impacts*  
• Reliability Impacts* |
| S2 - Improve Mobility           | • Improves Access to City Services  
• Provides Options for Enhancement of Efficient Movement of People and Goods That Reduces Traffic Congestion and Associated Air Pollution | • Air Pollution  
• Accident Impacts*  
• Streetscape Impacts*  
• Mobility Impacts*  
• Reliability Impacts* |
| S3 – Clean/Attractive City      | • Enhances Community Pride  
• Enhances Sense of Security  
• Enhances Enjoyment of Surroundings  
• Enhances Natural Resources | • Wetlands Value  
• Property Value Uplift  
• Heat Island Effect  
• Air Pollution/Carbon Emissions  
• Recreational Value  
• Water Quality Uplift  
• Recurring Subsidies  
• One Time Subsidies |
| S4 – Strong Economy             | • Business Expansion  
• New Enterprises  
• Fosters Entrepreneurship to Create Job Opportunities  
• Improves Incomes and Enhances Tax Base | • One Time Subsidies  
• Recurring Subsidies  
• Revenues  
• Other Benefits  
• Property Value Uplift |
## Project Prioritization

Aligning projects with citywide strategies

<table>
<thead>
<tr>
<th>CRITERIA – STRATEGIC OBJECTIVES</th>
<th>DESCRIPTION</th>
<th>AutoCASE Metrics</th>
</tr>
</thead>
</table>
| S5 – Development/Sustainability  | • Promotes Smart Growth in Targeted Areas  
• Promotes Best Development Practices  
• Minimizes Impacts on Environmental Quality  
• Improves Efficiencies in Service Delivery | • Operations & Maintenance  
• Water Costs  
• Wetlands Value  
• Property Value Uplift  
• Flood Risk Mitigation  
• Heat Island Effect  
• Air Pollution/Carbon Emissions  
• Recreational Value  
• Water Quality Uplift  
• Other Benefits |
| S6 – Improves Air Quality        | • Effects the Reduction of Air Pollutants and Non-mobile Emissions | • Heat Island Effect  
• Air Pollution/Carbon Emissions  
• Energy Savings |
## Project Prioritization

Aligning projects with citywide strategies

<table>
<thead>
<tr>
<th>CRITERIA – TACTICAL OBJECTIVES</th>
<th>DESCRIPTION</th>
<th>AutoCASE Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1 – Citizen/Customer Satisfaction</td>
<td>• Contributes to Meeting the Needs of Citizens or Customers</td>
<td>• Operations and Maintenance</td>
</tr>
<tr>
<td></td>
<td>• Contributes to Improving Service Levels</td>
<td>• Recreational Value</td>
</tr>
<tr>
<td></td>
<td>• Operations and Maintenance</td>
<td>• Flood Risk Mitigation</td>
</tr>
<tr>
<td></td>
<td>• Recreational Value</td>
<td>• Property Value Uplift</td>
</tr>
<tr>
<td></td>
<td>• Flood Risk Mitigation</td>
<td>• Water Quality Uplift</td>
</tr>
<tr>
<td>T2 – Prior CIP Approval</td>
<td>• Projected to Need Additional Funds</td>
<td>• CapEx</td>
</tr>
<tr>
<td></td>
<td>• Project is Still Economically Feasible</td>
<td>• Operations and Maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• One Time Subsidies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Recurring Subsidies</td>
</tr>
<tr>
<td>T3 – Partnership Opportunity</td>
<td>• Project Attracts Private or Public Joint Ventures/Partnerships</td>
<td>• One Time Subsidies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Recurring Subsidies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Revenues</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Other Benefits</td>
</tr>
<tr>
<td>T4 – Healthy Environment</td>
<td>• Improves Environmental Quality</td>
<td>• Water Costs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Wetlands Value</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Recreational Value</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Air Pollution/Carbon Emissions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Water Quality Uplift</td>
</tr>
</tbody>
</table>
## Project Prioritization

### Aligning projects with citywide strategies

<table>
<thead>
<tr>
<th>CRITERIA – OTHER FACTORS</th>
<th>DESCRIPTION</th>
<th>AutoCASE Metrics</th>
</tr>
</thead>
</table>
| O1 – Inter-organizational/Joint Infrastructure | • Prompted by Matters of Overlapping Project Issues  
• Prompted by Opportunities for Economies of Scale to Improve Execution Efficiencies | • CapEx  
• Operations & Maintenance  
• Water Costs  
• Recreational Value  
• Revenues  
• Subsidies |
| O2 – Leverage Funding | • Projects Eligible for Grants or Can Leverage Funding From Public or Quasi-public Sources to Offset Cost or Provide Entire Financing | • One Time Subsidies  
• Recurring Subsidies  
• Shadow Wage Benefit  
• Environmental Metrics  
• Mobility Metrics* |
| O3 – Obligatory | • Projects That Result From Contractual Obligations, Actions by Other Entities or Prior Commitments | N/A |
| O4 – Time Sensitive | • Projects With Near-term Operational Requirements or Business Opportunities | • Time Value of $ Factors Into All Measurements |
Project Prioritization

Central Arlington Heights

Central Arlington Heights Watershed
Project Prioritization

Central Arlington Heights

CAH Conveyance and Surface Detention Alternative Evaluation
Project Prioritization

Central Arlington Heights

Collinwood Avenue
Project Prioritization

Central Arlington Heights

Collinwood Avenue
## Project Prioritization

### Preliminary evaluation results

<table>
<thead>
<tr>
<th></th>
<th>TOTAL COST</th>
<th>TOTAL BENEFITS</th>
<th>BCR</th>
<th>FINANCIAL NPV</th>
<th>SUSTAINABLE NPV</th>
<th>DISCOUNTED PAYBACK PERIOD</th>
<th>FW CPEC</th>
</tr>
</thead>
<tbody>
<tr>
<td>PIPE REHABILITATION</td>
<td>($6,283,483)</td>
<td>$12,827</td>
<td>0.00</td>
<td>($6,283,423)</td>
<td>($6,270,564)</td>
<td>DOES NOT PAYBACK</td>
<td>D1, D3, O3</td>
</tr>
<tr>
<td>ACQUISITION AND GREENWAY DETENTION</td>
<td>($10,080,848)</td>
<td>$13,884,461</td>
<td>1.38</td>
<td>$3,125,245</td>
<td>$3,827,484</td>
<td>57 &amp; 47 YEARS</td>
<td>D1, D2, D3, D4, S1, S3, S4, S5, S6, T1, T3, T4</td>
</tr>
<tr>
<td>STRIPLING SUBSURFACE DETENTION</td>
<td>($2,910,014)</td>
<td>$2,910,480</td>
<td>1.00</td>
<td>($10,014)</td>
<td>$475</td>
<td>DOES NOT PAYBACK</td>
<td>S1, T1</td>
</tr>
<tr>
<td>SOUTH HIGHLAND SURFACE DETENTION</td>
<td>($572,988)</td>
<td>$2,071,346</td>
<td>3.61</td>
<td>$1,427,012</td>
<td>$1,500,460</td>
<td>24 &amp; 22 YEARS</td>
<td>D1, D4, S1, T1, O1</td>
</tr>
<tr>
<td>CONVEYANCE AND SURFACE DETENTION</td>
<td>($19,908,238)</td>
<td>$27,738,405</td>
<td>1.39</td>
<td>$7,392,530</td>
<td>$7,844,611</td>
<td>55 &amp; 52 YEARS</td>
<td>D1, D2, D3, D4, S1, S3, S4, S5, S6, T1, T3, T4</td>
</tr>
</tbody>
</table>
Next Steps

SROI is a valuable tool with multiple applications

1) Panther Island – Moving forward with design of open space LID option

2) Incorporating SROI and AutoCASE evaluation into Stormwater Master Plan and Implementation Program

3) Central Arlington Heights – Incorporating SROI evaluation results into design of the selected alternative
Questions?
Sustainable CIP Planning
Maximizing return on infrastructure investments to create resilient communities

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Texas APA Conference
San Antonio
November 4th, 2016