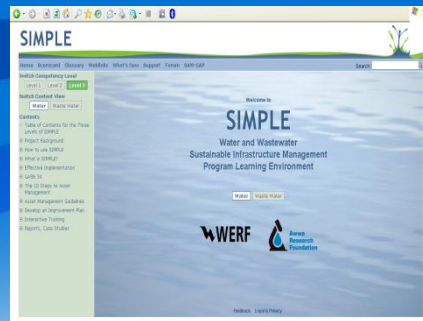




Portland's Involvement in Water Research Foundation Infrastructure and Asset Management Research Efforts



Jeff Leighton



Asset Management Road Map



Initiatives

1. Asset Management Framework and Models for Organizations
2. Risk Management
3. Condition Assessment and Performance Monitoring
4. Decision Making for Capital Improvement Programs and Replacement and Renewal
5. IT and Data Management for Asset Management
6. Operation and Maintenance Practices



Completed AM Research Projects Co-funded w/ WERF

Title	Status	Search for our website for:
Condition Assessment Strategies and Protocols for Water and Wastewater Utility Assets	Done	Report 3048
SIMPLE website	Done, final product is a website	Project 4013
SAM GAP	Done, final product is an online questionnaire on SIMPLE	Project 4013

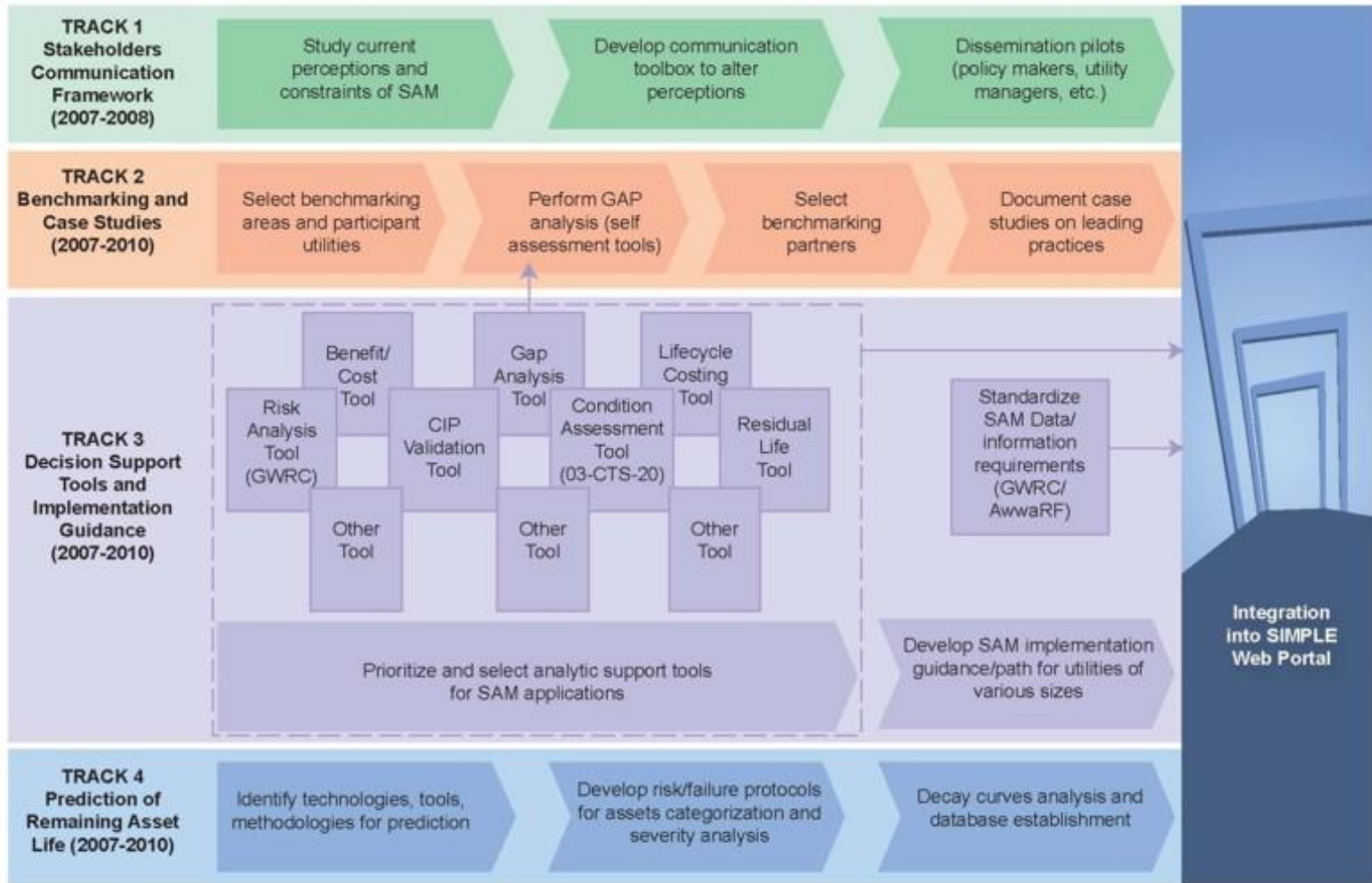
Completed AM Research Projects Co-funded w/ GWRC: WERF, UKWIR, WSAA

Title	Status	Search for our website for:
Risk Management Tool	Done, to be published.	Project 4126
Benefit Cost Tool	Done, to be published as a CD and via SIMPLE website	Project 4127
Case Studies in Asset Management, 1-US drinking water, 2-International	1-done, 2- ongoing	Project 4111

Current AM Research Projects

Title	Status	Search for our website for:
Implementing Effective Asset Management in Water Utilities: Organizational Models, Culture, Policies, and Strategies	Ongoing	Project 4173
Key Asset Data for Water Sector Utilities, w/ WERF	Ongoing	Project 4187
Condition Assessment of Water Main Appurtenances, w/ CSIRO	Ongoing	Project 4188
Trial: US Mains Failures Database based upon UKWIR model, w/ UKWIR	Ongoing	Project 4195
Best Maintenance Practices for Water Distribution System Assets (partnership, if any, TBD)	Funded 2009	Project 4237

WERF CHALLENGE #06-SAM-1CO: KEY TASKS AND IMPLEMENTATION (2007-2010)
(WERF - GWRC - AwwaRF Funded)

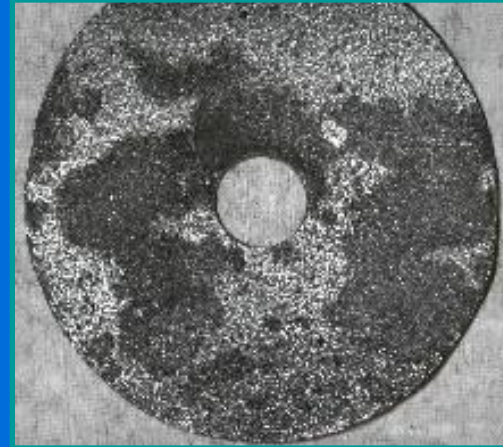


Condition Assessment



Condition Assessment Strategies Report

- Compilation of detailed information on condition assessment tools and techniques
- Case studies on the use of these tools and techniques at utilities in the U.S., Australia, NZ and the UK
- Also covers issues related to asset management and justification of condition assessment in terms of benefits and costs



SIMPLE website

The screenshot shows a web browser window displaying the SIMPLE website. The browser's address bar and toolbar are visible at the top. The website header features the word "SIMPLE" in large blue letters on the left and a stylized green plant logo on the right. Below the header is a navigation menu with links: Home, Scorecard, Glossary, Weblinks, What's New, Support, Forum, and SAM-GAP. A search bar is located on the right side of the navigation menu.

On the left side of the main content area, there is a sidebar with the following sections:

- Switch Competency Level**: Three buttons labeled "Level 1", "Level 2", and "Level 3". "Level 3" is highlighted with a green border.
- Switch Content View**: Two buttons labeled "Water" and "Waste Water". "Water" is highlighted with a white border.
- Contents**: A list of links with expandable icons:
 - Table of Contents for the Three Levels of SIMPLE
 - Project Background
 - How to use SIMPLE
 - What is SIMPLE?
 - Effective Implementation
 - GASB 34
 - The 10 Steps to Asset Management
 - Asset Management Guidelines
 - Develop an Improvement Plan
 - Interactive Training
 - Reports, Case Studies

The main content area has a background image of water ripples. The text in the center reads:

Welcome to
SIMPLE
Water and Wastewater
Sustainable Infrastructure Management
Program Learning Environment

Below this text are two buttons: "Water" (highlighted) and "Waste Water".

At the bottom of the main content area, there are two logos: the WWERF logo and the Awwa Research Foundation logo.

At the very bottom of the page, there are links for "Feedback" and "Legal & Privacy".


Project Snapshot: Sustainable Infrastructure Management Program Learning Environment (SIMPLE), - Microsoft Internet Explorer p

http://www.awwarf.org/research/TopicsAndProjects/projectSnapshot.aspx?pn=4013

File Edit View Favorites Tools Help

Google G Go 839 blocked Check AutoLink AutoFill Send to Settings

Project Snapshot: Sustainable Infrastructure Manage...



subscriber only | short cuts | contact us | site search

Research - Topics And Projects

[Featured Topics](#) | [Project Center](#) | [Order Reports](#) | [Supporting Resources](#) | [New Search](#)

Project Snapshot

Sustainable Infrastructure Management Program Learning Environment (SIMPLE), Version 1.1 #4013

Project Summary:

Modified the existing wastewater-specific asset management website SIMPLE launched by WERF, with drinking water content to create SIMPLE, version 1.1. SIMPLE, Sustainable Infrastructure Management Program Learning Environment, is a guidance manual with user interaction via the chat room and a question and answer section. SIMPLE v.1.1 went live April 2008. The SIMPLE website also contains an asset management tool (called SAM GAP, an online questionnaire) that will help users identify areas for improvement in their asset management programs. Over time, more interactive tools may be added. **Click on *Supporting Resources* to get to the SIMPLE website. Research partner: WERF.**

Contractor: Water Environment Research Foundation

Collaborative Partners: [Water Environment Research Foundation](#)

Project Manager: [Maureen Hodgins](#)

Project Details

RFP

[Abstract](#)

Scope Of Work

Project Update

[Participants](#)

[Supporting Resources](#)

Project Profile / Order Report

The Foundation ▶

News and Events ▶

Research ▶

Research Center

Project Center


RFPs

What's New

Feedback

Site Map

Privacy Policy ▶



Awwa Research Foundation

Advancing the Science of Water*



Switch Competency Level

-

Switch Content View

-

Contents

- Table of Contents for the Three Levels of SIMPLE
- ⊞ Project Background
- ⊞ How to use SIMPLE
- ⊞ What is SIMPLE?
- ⊞ Getting Started
- ⊞ Effective Implementation
- ⊞ Asset Management for Small Utilities
- ⊞ GASB 34
- ⊞ Develop an Improvement Plan
- ⊞ Interactive Training
- ⊞ Reports, Case Studies

Contents

Table of Contents for the Three Levels of SIMPLE

The three levels in SIMPLE cover:

LEVEL 1	LEVEL 2	LEVEL 3
How to Use SIMPLE	How to Use SIMPLE	How to Use SIMPLE
What is SIMPLE?	What is SIMPLE?	What is SIMPLE?
Getting Started <ul style="list-style-type: none"> • What is Asset Management? • Options for Getting Started • Matching Inputs and Outputs 	Getting Started <ul style="list-style-type: none"> • What is Asset Management? • Options for Getting Started • Matching Inputs and Outputs 	
Effective Implementation <ul style="list-style-type: none"> • Implementation Phases • Implementation Phase Activities 	Effective Implementation <ul style="list-style-type: none"> • Implementation Phases • Implementation Phase Activities 	Effective Implementation <ul style="list-style-type: none"> • Implementation Phases • Implementation Phase Activities
Asset Management for Small Utilities <ul style="list-style-type: none"> • Overview • Step 1 - How do I Inventory my Assets? • Step 2 - How do I Prioritize my Assets? • Step 3 - How do I Plan for the Future? • Step 4 - How do I Carry Out this Plan? • Step 5 - What should I do Next? • Worksheets • Appendices 		
GASB34 <ul style="list-style-type: none"> • Who is GASB and What is Statement 34/37? • How was Governmental Accounting Done Before Statement 34? • How Does Statement 34 Change the Way We Used to do Accounting? • If This is all about Disclosure, then What Exactly is Being Disclosed? • I'm not a Finance Type, I'm a Line Manager. What do these Changes Mean to Me? • Information for Utilities • Conclusions 	GASB34 <ul style="list-style-type: none"> • Who is GASB and What is Statement 34/37? • How was Governmental Accounting Done Before Statement 34? • How Does Statement 34 Change the Way We Used to do Accounting? • If This is all about Disclosure, then What Exactly is Being Disclosed? • I'm not a Finance Type, I'm a Line Manager. What do these Changes Mean to Me? • Information for Utilities • Conclusions 	GASB34 <ul style="list-style-type: none"> • Who is GASB and What is Statement 34/37? • How was Governmental Accounting Done Before Statement 34? • How Does Statement 34 Change the Way We Used to do Accounting? • If This is all about Disclosure, then What Exactly is Being Disclosed? • I'm not a Finance Type, I'm a Line Manager. What do these Changes Mean to Me? • Information for Utilities • Conclusions
		The 10 Steps to Asset Management <ul style="list-style-type: none"> • Develop Asset Registry • Assess Condition, Failure Modes

SIMPLE model uses

Topics / objective	Description / uses
Scorecard	10 questions that set user level key concepts that test user knowledge
The 10 Steps to Asset Management Five Core Asset Management Questions	Asset Management basics / quick introduction
Imbedded graphics	Copy for presentations
Tom's Bad Day	Interactive training session
Access to SAM GAP	Utility performance
Bureau's interactive session	Training approach for staff

SAM GAP

SAM-GAP View Assessment - Windows Internet Explorer

http://kms.ghd.com.au/samgap/User/AssessmentView.aspx?UserID=348F659A6A24FF9CAB218EF2AFCD9DCP&AssessmentID=BF21FB9E8E52DFAEB76F1ADAE6475DC8

File Edit View Favorites Tools Help

Links My Yahoo! USAir Delta Marriott Hertz external.ghd.com My eRooms WERF SAM Quick Fit Binders OfficeMax PublicRadioFan.com NPR CR NOAA Charlotte CLT City Cntr Gmail FedEx

Google

SAM-GAP View Assessment

SAM-GAP

Examine the situation, Expose the problems, Execute the improvements.

Main Help Change Password Logout

Assessment Locked: Assessment can not be changed because the Report has been generated

1 Processes and Practices

Asset management is ultimately about the effective management of the entire life cycle of an asset - more fundamentally, which practices are most cost effective to apply at what point in that life cycle. Processes and practices must be in place that supports decision-making throughout all stages of an asset's life.

Processes and Practices Information Systems Data and Knowledge Service Delivery Organizational Issues People Issues Asset Management Plans

1.01 Demand Analysis

Identify strategies to align demand for a service with an organization's capacity to service the demand and enable the staged development of resources to meet forecasts in service demand over time

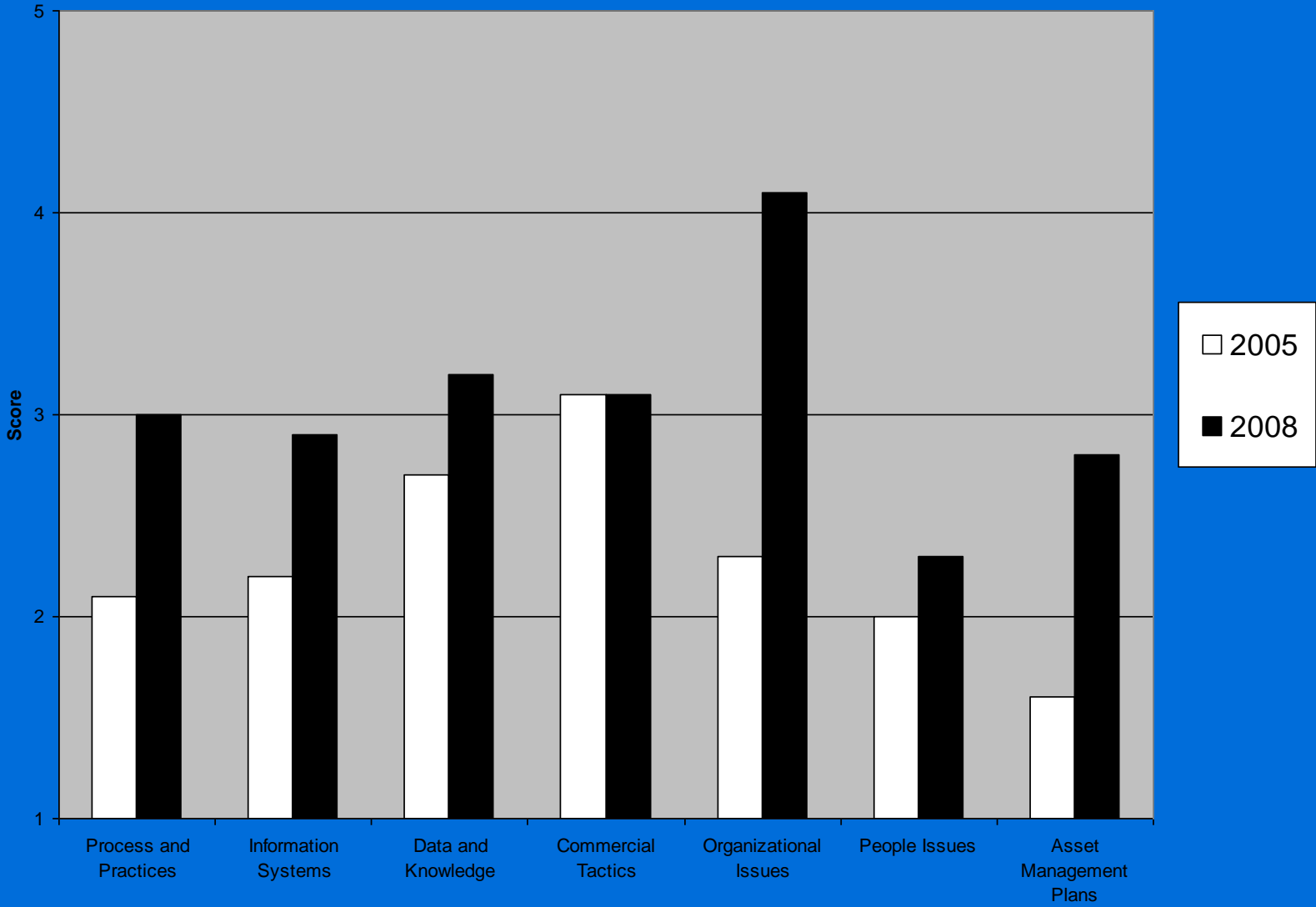
1.01 1.02 1.03 1.04 1.05 1.06 1.07 1.08 1.09 1.10 1.11 1.12

Legend: Current Item Uncompleted Item Completed Item Unanswered Question

To what extent and at what level do processes exist for:

<p>1.01.01 For managing historic records of customer and stakeholder demands on the utility system. (eg How does the organization determine what data that reflects historical demand to collect, how it is to be maintained, and who should be responsible to maintain it?)</p>	<p>Level of practice</p> <p>0 1 2 3 4 5</p> <p>0 = "Innocence", 1 = Aware but no practice, 2 = Low practice level, 3 = Modest practice level, 4 = Substantial practice level, 5 = "World class" practice level</p>	<p>Extent of practice</p> <p>0 1 2 3 4 5</p> <p>0 = Never done, 1 = Ad hoc process rarely executed, 2 = Ad hoc process occasionally executed, 3 = Mixture of ad hoc and systematic process, partially documented, 4 = Mostly systematic process, pretty well documented, and regularly executed, 5 = Systematic, fully documented process, always executed</p>
<p>1.01.02 For breaking up customer demand for services into key drivers and understanding their influences on future demand. (eg. Does the organization understand the impacts on customers of demographic changes in customer base, growth, aging infrastructure, key stakeholders, state and nature of economy, pending or proposed changes in regulations, etc)</p>	<p>Level of practice</p> <p>0 1 2 3 4 5</p> <p>0 = "Innocence", 1 = Aware but no practice, 2 = Low practice level, 3 = Modest practice level, 4 = Substantial practice level, 5 = "World class" practice level</p>	<p>Extent of practice</p> <p>0 1 2 3 4 5</p> <p>0 = Never done, 1 = Ad hoc process rarely executed, 2 = Ad hoc process occasionally executed, 3 = Mixture of ad hoc and systematic process, partially documented, 4 = Mostly systematic process, pretty well documented, and regularly executed, 5 = Systematic, fully documented</p>

Asset Management Gap Analysis



SAM-GAP

Process Area	# Q	Average Score		Basis for improvement
		2008	2005	
1.01 Demand Analysis	5	3.7	3.8	
1.02 Knowledge of Assets	5	3.2	2.6	Selection of assets to do condition assessment
1.03 Accounting and Costing	7	2.9	1.6	Useful lives, future expenditures, risk analysis
1.04 Strategic Planning	9	2.9	1.8	Risk of asset failure, business cases
1.05 Capital Expenditure Evaluation	8	2.9	1.9	PCR/BDR
1.06 Business Risk Management	5	3.2	1.6	CLEM process / risk of asset failure
1.07 Creation and Acquisition	7	3.2	2.4	PRB, value engineering
1.08 Rationalization and Disposal	2	3	2.5	
1.09 Operations	7	3.2	2.4	O&M manuals
1.1 Maintenance	9	2.6	1.6	Maintenance strategies, CMMS, SOP reviews
1.11 Work and Resource Management	5	2.7	2.4	CMMS work order priorities
1.12 Continuous Improvement	6	2.4	1.3	Benchmarking; process mapping, E3
1 Process and Practices	75	3	2.1	
2.01 Primary Information Systems	10	3.4	2.5	GIS / CMMS
2.02 Secondary Information Systems	5	3	2.4	
2.03 Tertiary Information Systems	6	2.1	1.3	CLEM, PTS
2.04 Information System Issues	4	2.9	2.5	Outlining IT Plan
2 Information Systems	25	2.9	2.2	
3.01 Primary Data and Knowledge	6	3.7	3.3	* Replacement value
3.02 Secondary Data and Knowledge	5	3.2	3.2	* Condition assessment
3.03 Tertiary Data and Knowledge	4	2.3	1.3	Cost data
3 Data and Knowledge	15	3.2	2.7	
4 Commercial Tactics	8	3.1	3.1	*
5 Organizational Issues	7	4.1	2.3	AMG, AMSC, AM Charter
6 People Issues	7	2.3	2	AM Charter
7 Asset Management Plans	12	2.8	1.6	AMPs, CLEM, PCR/BDR

1 = Aware; 2 = Low practice level; 3 = Modest practice level; 4 = Substantial practice level; 5 = World class practice
 For Section 3: 1 = 30%; 2 = 50%; 3 = 65%; 4 = 80%; 5 = 95%

* Question about original scores and different response descriptions

Benefit Cost Tool

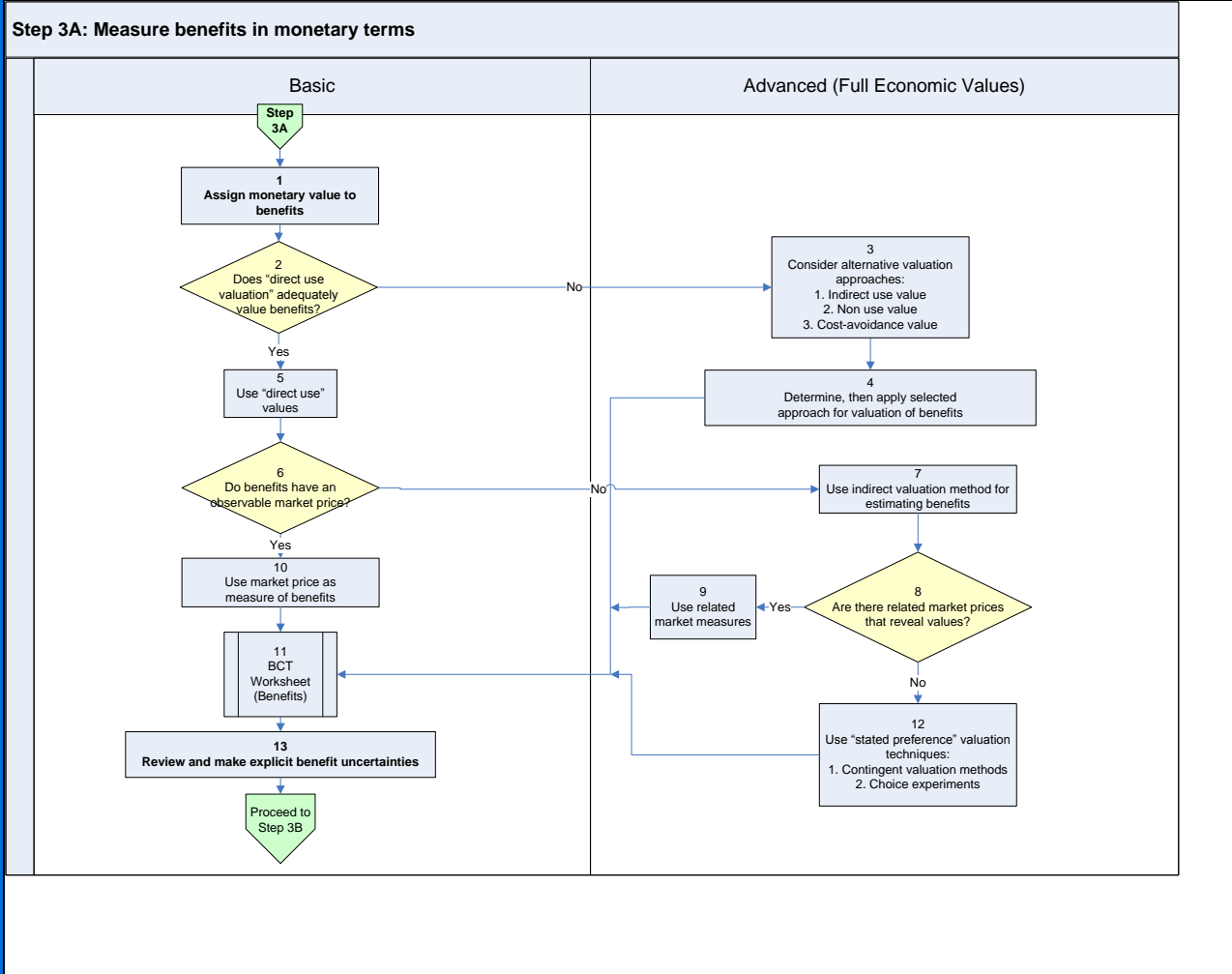


What is “Benefit Cost Analysis?”

- Step 1: Establish and rigorously define the purpose of the analysis**
- Step 2: Formulate baseline parameters and assumptions**
- Step 3A: Measure benefits in monetary terms**
- Step 3B: Measure costs in monetary terms**
- Step 4: Determine NPV of benefit and costs**
- Step 5: Adjust for distributional effects**
- Step 6: Review, Finalize Recommendation(s)**

What is WERF’s SAM Project

Useful Links



Initial Prototype: Benefit Cost Worksheet

(Title of Alternative)										
Discount rate	5.00%									
Benefits										
	Year	1	2	3	4	5	6	7	8	9
Direct Organizational Benefits										
Increase in revenue	\$	1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000
Reduction in expenses										
Customer Benefits										
Reduction in property damage costs, including restoration of business										
Reduction in service outage costs										
Reduction in service outage mitigation and substitution costs										
Reduction in access impairment and travel delay costs										
Reduction in health damages										
Community/Stakeholder Benefits										
Reduction in emotional strain and welfare										
Reduction in environmental pollution, erosion, sedimentation										
Reduction in destruction of habitat or damage to it										
Increase in attractiveness (economic, tourists)										
Total Benefits	\$	1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000	\$ 1,000
PV of Total Benefits	\$	952	\$ 907	\$ 864	\$ 823	\$ 784	\$ 746	\$ 711	\$ 677	\$ 645
Costs										
Direct Organizational Costs										
Repair and return to service costs	\$	100	\$ 100	\$ 100	\$ 100	\$ 100	\$ 100	\$ 100	\$ 100	\$ 100
Service outage mitigation costs										
Utility emergency response costs										
Public safety costs										
Administrative and legal costs of damage settlements										
Lost product costs										
Customer Costs										
Property damage costs, including restoration of business										
Service outage costs										
Service outage mitigation and substitution costs										
Access impairment and travel delay costs										
Health damages										
Community/Stakeholder Costs										
Emotional strain and welfare										
Environmental pollution, erosion, sedimentation										
Destruction of habitat or damage to it										
Attractiveness (economic, tourists)										
Total Costs	\$	100	\$ 100	\$ 100	\$ 100	\$ 100	\$ 100	\$ 100	\$ 100	\$ 100
PV of Total Costs	\$	95	\$ 91	\$ 86	\$ 82	\$ 78	\$ 75	\$ 71	\$ 68	\$ 64
NPV (PV of Benefits minus Costs)	\$	857	\$ 816	\$ 777	\$ 740	\$ 705	\$ 672	\$ 640	\$ 609	\$ 580
Benefit/Cost Ratio		10.00 / 1.00								

Portland's Approach to Benefit Cost Analysis

Portland Water Bureau

Business Case Development Guidebook

Draft

3/31/09



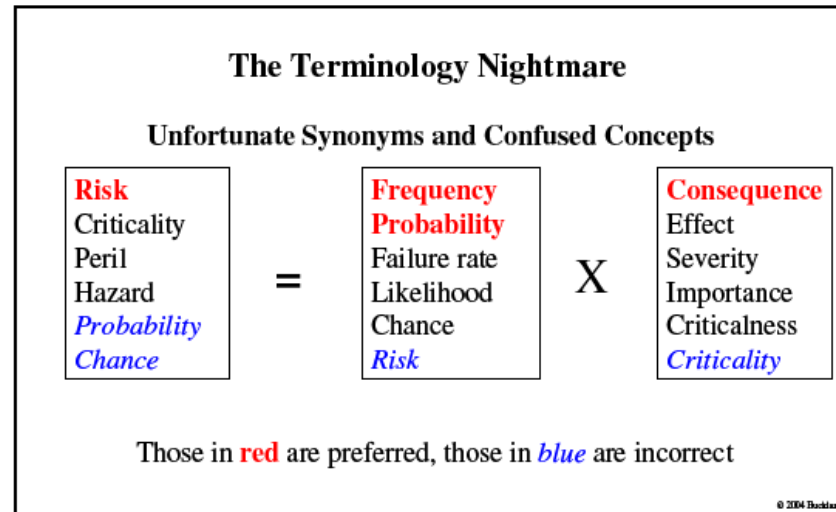
March 2009

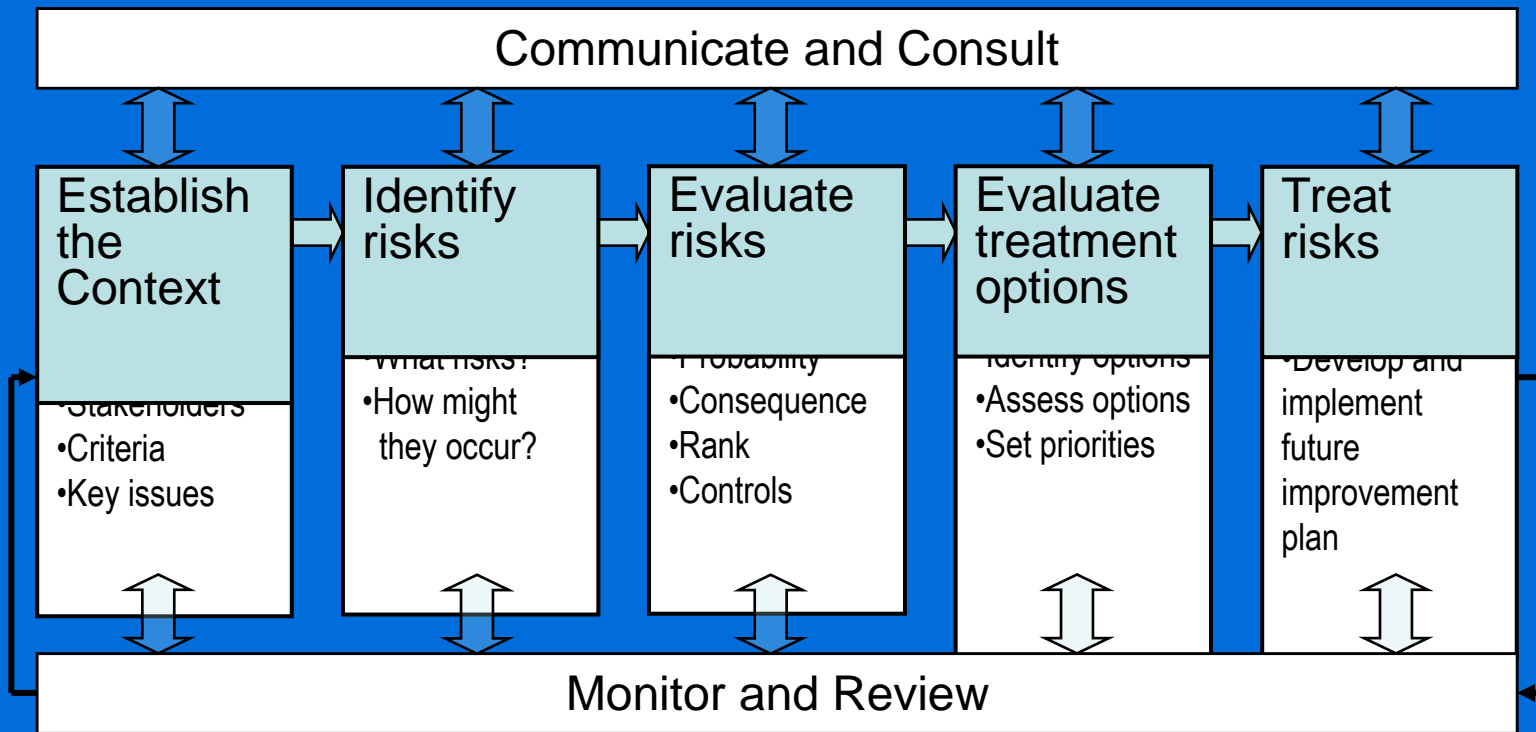
Developed by:
Eric Brainich
Asset Management

Triple Bottom Line Benefits Worksheet				Total Benefits		B/C Ratio		
Alternative (Name)				\$ 1,577,552		1.26		
Duration (years)				\$ 1,331,383				
Triple Bottom Line	Type of Benefit	Benefits (Annualized)	Impact Metrics	Total Stream of Benefits	Total Discounted Value			
			Units	Annual impact (\$)				
Discount rate: 3.0%								
Financial	Direct Utility Benefits	Monetary value of new service (new revenue generated)/year		\$4,500	\$360,000	\$125,903		
		Reduction in real costs			\$0	\$0		
		Increase in overall level of staff skills/year			\$0	\$0		
		Reduction in injuries/year			\$0	\$0		
		Reduction in Utility "lost product sales"/year			\$0	\$0		
	Direct Customer Benefits	Reduction in customer "Lost income"/year			\$0	\$0		
		Improved pressure			\$13,550	\$1,084,000	\$409,220	
		Increased system reliability, availability/year			\$0	\$0	\$0	
		Improved fire flow			\$32,000	\$2,000,000	\$981,525	
						\$0	\$0	
				Subtotal	\$4,044,000	\$1,526,648		
Discount rate: 3.0%								
Social / Community	Indirect and Intangible Utility Benefits	Improvement in community health			\$0	\$0		
		Reduction in emotional strain and welfare			\$0	\$0		
		Cost avoidance: reduction in property damage costs, including clean-up and restoration of business			\$0	\$0		
		Cost avoidance: reduction in non-compensateable service outage mitigation and substitution costs			\$5,000	\$400,000	\$151,004	
		Cost avoidance: Reduction in non-compensateable access impairment and travel delay costs			\$0	\$0	\$0	
		Cost avoidance: reduction in non-compensateable "lost income" costs				\$0	\$0	
				Subtotal	\$400,000	\$151,004		
Discount Rate: 3.0%								
Environmental	Indirect and Intangible Utility Benefits	Reduction of pollutant discharges:			\$0	\$0		
		Improvement of habitat			\$0	\$0		
		Decrease in carbon emission			\$0	\$0		
				Subtotal	\$0	\$0		
				Grand Total All Benefits	4,444,000	\$1,677,552		

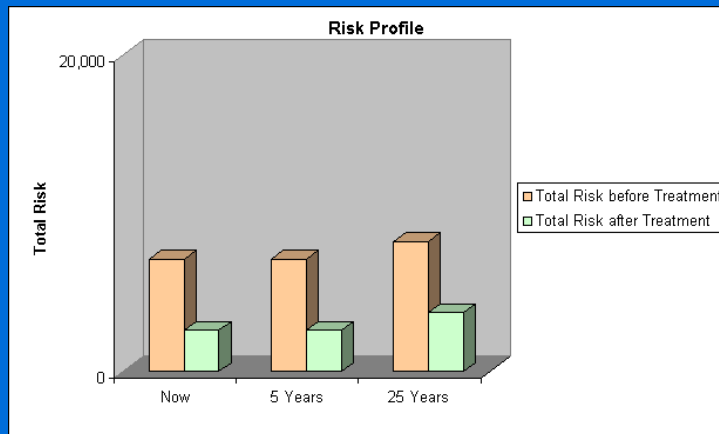
Risk Analysis Tool

Figure 1: Terms commonly used in defining risk





Source: Developed from the International Infrastructure Management Manual, 2002 and the AS/NZS 4360: 2004



Portland's Approach to Risk Analysis

Table 5.1 Preliminary risk evaluation & management matrix for Social, Environmental and Economic Consequence

Likelihood of Failure	Consequence				
	Insignificant 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
5	L	M	H	E	E
4	L	L	M	H	E
3	N	N	L	M	H
2	N	N	N	L	M
1	N	N	N	N	L

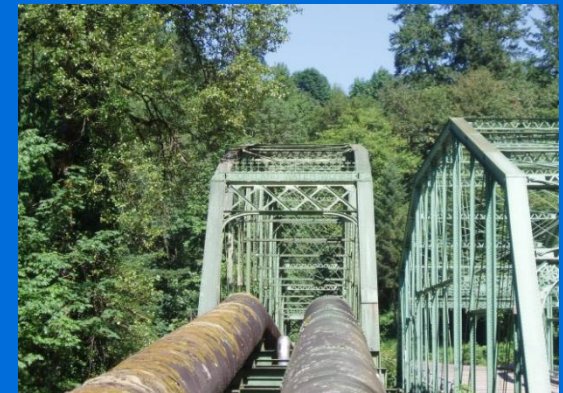
Key to the Level of Risk:

E: Extreme risk. Immediate action required such as replacement or repair to



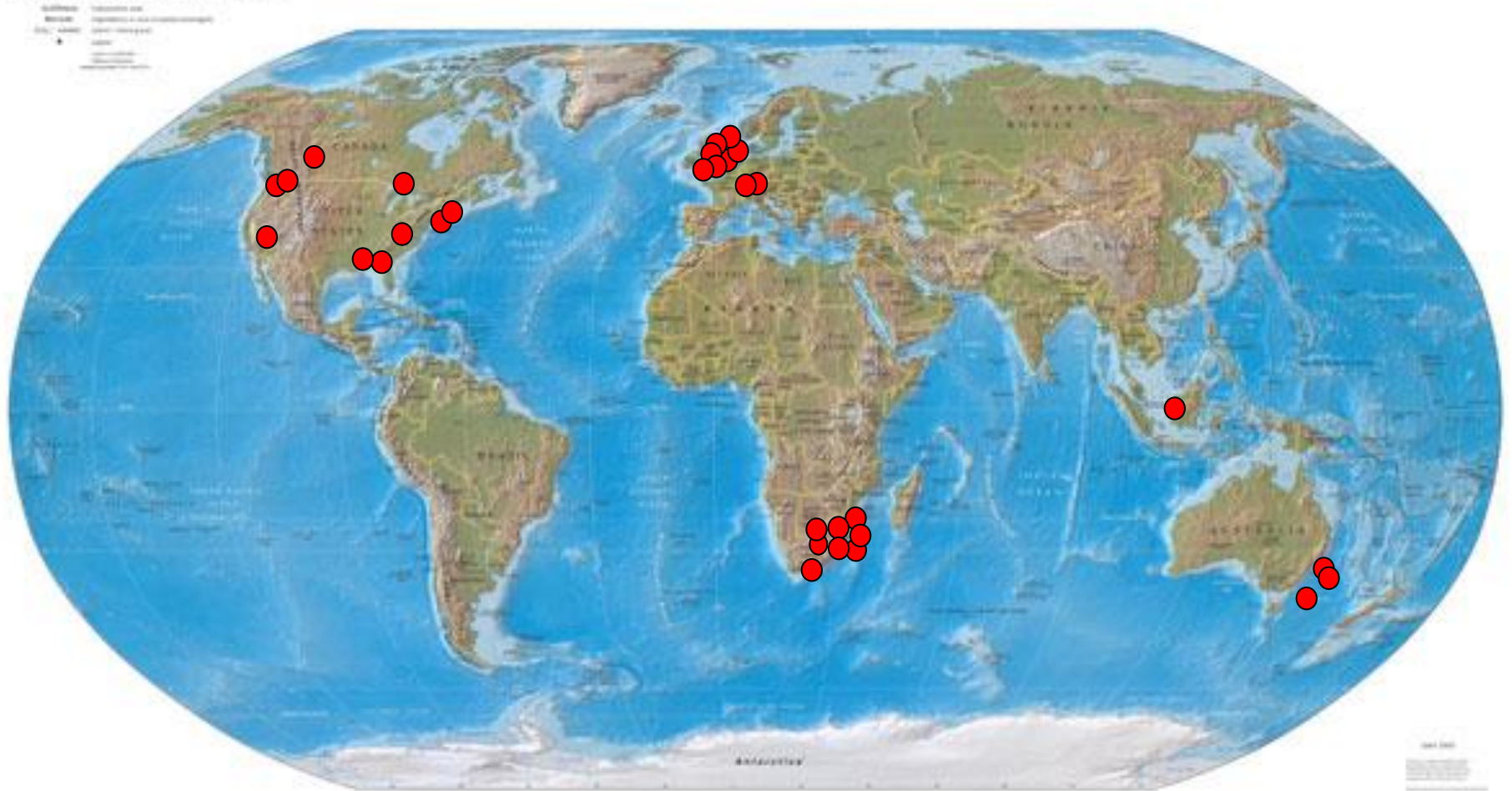
Table 5.2 Opex and Capex decisions on water supply and sewerage assets

Level of Evaluated Risk	Sewerage Assets		Water Supply Assets	
	Opex Actions	Capex Actions	Opex Actions	Capex Actions
Extreme	CCTV or Inspect immediately to assess LOF, and determine if repair is warranted	Renew or replace within 12 months of evaluation	Test or Inspect immediately to assess LOF, and determine if repair is warranted	Renew or replace within 12 months
High	CCTV or Inspect annually or Repair within 12 months	Renew or replace within 5 years	Test or inspect annually or Repair within 12 months	Renew or replace within 5 years
Medium	CCTV or Inspect every 3 years to assess LOF	Renew or replace within 10 years	Test or inspect every 3 years to assess LOF	Renew or replace within 10 years
Low	CCTV or Inspect every 6 years to assess LOF	Renew within the lesser of life of asset or 20 yrs	Test or inspect every 6 years to assess LOF	Renew within the lesser of life of asset or 20 yrs
Negligible	Do nothing	Do nothing	Do nothing	Do nothing



Utility Case Studies

Physical Map of the World, June 2003



AM Case Studies, Topic Areas



- Building an Asset Management Program (6)
- Buried Assets (5), examples: main replacement, condition assessment
- Decision Making (3), example: TBL
- Water Loss (3)
- Risk (3)

Current AM Research Projects

Title	Status	Search for our website for:
Implementing Effective Asset Management in Water Utilities: Organizational Models, Culture, Policies, and Strategies	Ongoing	Project 4173
Key Asset Data for Water Sector Utilities, w/ WERF	Ongoing	Project 4187
Condition Assessment of Water Main Appurtenances, w/ CSIRO	Ongoing	Project 4188
Trial: US Mains Failures Database based upon UKWIR model, w/ UKWIR	Ongoing	Project 4195
Best Maintenance Practices for Water Distribution System Assets (partnership, if any, TBD)	Funded 2009	Project 4237

Research Advisory Council

Infrastructure Research Advisory Council, Topic Areas and Current Number of Project Concepts

- Asset Management (10)
Guidance Document for Best Maintenance Practices for Water Distribution Assets (AM8), High
- Corrosion Control (9)
- Cross Connection and Backflow (6)
- Climate Change (8*)
- Leakage (4)
How to Choose Most Appropriate Leak Survey for Your Distribution System (L1), High
- Materials (4)
- Security (1)
- Water Quality (8*)



Infrastructure Research Advisory Council, Schedule and Opportunities

- January to June, RAC Monthly Discussion of Topic Areas
- Mid-July, RAC meets

Opportunities for PNWS Research Committee:

- Forward project ideas
- Offer opinions on the value of current topics



I welcome your
questions or
comments

jleighton@water.ci.portland.or.us