



Implementing Sustainable Infrastructure Practice: A Case Study

AAPA Marine Terminal Management Training Program
September 12, 2013



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Agenda

- Why Sustainable Infrastructure?
- Why Sustainable Development Project Guidelines?
- Three Systems
- One Case Study

Why Sustainable Infrastructure?

- Current rate of global development is unsustainable
- Distribution of infrastructure and affluence are inequitable
- Local impacts mimic global issues
- Preserve development options and competitive strategies
- Compatible industrial and community development
- Conserve financial, community and environmental resources
- Doing the project "right" or doing the "right" project?

Why Sustainable Development Project Guidelines?

- Support strategic policy goals
- Use familiar processes to demonstrate sustainability
- Fill a need articulated across port industry
- Provide a consistent measurement of sustainability
- Tangible evidence of competency
- Demonstrated need to develop a project sustainability "rating" system

Why Sustainable Development Project Guidelines?



Can a reasonable port infrastructure sustainability rating system be developed?

POLB Case Study

- Initiated implementation in 2010
- POLB Sustainable Design and Construction Guidelines
- West Coast Ports Joint Technical Committee for Sustainable Project Guidelines
 - in affiliation w/ AAPA
- Institute for Sustainable Infrastructure (ISI)
 - Envision[®] Sustainable Infrastructure Rating System
 - Sponsored by ASCE/ACEC/APWA

POLB Sustainable Design & Construction Guidelines

Components Overview

1. Attributes & Projects
2. Checklists of sustainable strategies
3. Flow charts for process control
4. Implementation checklists for quality review
5. Sustainability summary sheets for “report cards”



PORT OF LONG BEACH SUSTAINABLE DESIGN AND CONSTRUCTION GUIDELINES

Prepared by:



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PRINT DATE: 11/12/2010

POLB Sustainable Design & Construction Guidelines

Strategic Checklists

By project type...

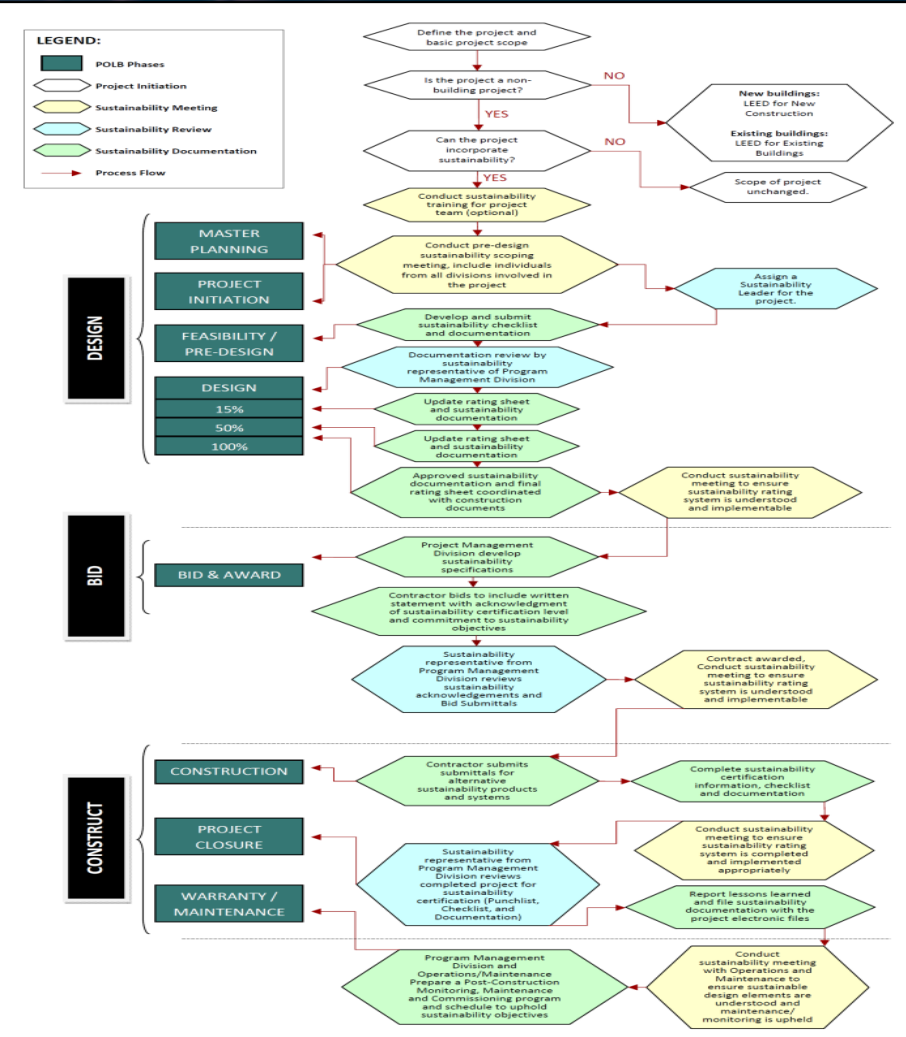
- Dredging
- Wharves
- Roadways, Railways & Bridges
- Stormwater Management
- Landscaping
- Utilities Systems
- Demolition
- Revetment
- Terminals
- Remediation Projects
- Geotechnical Soil Improvement
- Traffic Management
- Technology Projects

POLB Sustainable Design & Construction Guidelines

Process Flow Chart

Controlling the Process

- Standardize delivery process
- Identify specific and integrated implementation tasks
- Summarizes recommended meetings, reviews, and documentation steps
- Integrate sustainability into existing Port processes



POLB Sustainable Design & Construction Guidelines

Process Checklists

Controlling quality

- Coordinate/communicate with other divisions
- Clearly define project criteria in specifications
- Reinforce design intent
- Identify sustainable attributes throughout the project life cycle

2.3.1 Master Planning: Process Checklist
Consider:

- If the project is a new building or retrofit of an existing building?
 - If yes, refer to LEED rating system.
 - If no, refer to Port of Long Beach Sustainable Design and Construction Guidelines - Strategies Checklists to determine sustainability attributes applicable to the project that are within the project scope and boundaries.
- Providing sustainability training for project team including a review of the Sustainability Guidelines.
- Incorporating a Sustainability Project Planning Meeting into the Project Kickoff Meeting including:
 - Engaging all project stakeholders;
 - Setting sustainability performance expectations;
 - Identifying sustainability goals.

2.3.7 Project Closure: Process Checklist
Consider:

- Educating developers, stakeholders, tenants, employees, etc. about sustainability and sustainable project design and construction, including:
 - Training Seminars;
 - Educational Programs;
 - Coordination with existing Port programs;
 - Participation in school programs (K-12, Colleges and Universities);
 - Publications
- Maintaining a data sustainable project
 - Amending
 - Including improved
 - Document
 - R
 - R
 - E
 - A
 - R
 - Ir
 - Ir
 - E
 - Ir
- Maintaining a data

2.3.4 Design 15/50/100%: Process Checklist
Consider:

- Completion of Design Stage consider facilitating a meeting between POLB staff (and others as necessary) to describe:
 - The selected sustainability strategies;
 - The selection process;
 - Feasibility (cost and benefits); and
 - How the project conforms to the POLB Green Port Policy, etc.
- After completing the Planning and Design phases of the project, the final sustainability rating checklist should be signed by the Project Team Leader and submitted to the Director of Program Management.

Possible Documentation:

- Project documentation.
- Database of POLB sustainable contractors.
- Internal Team meeting minutes regarding sustainability discussions.

Approval Signature: _____ **MM/DD/YYYY**
 Digital Signature Date

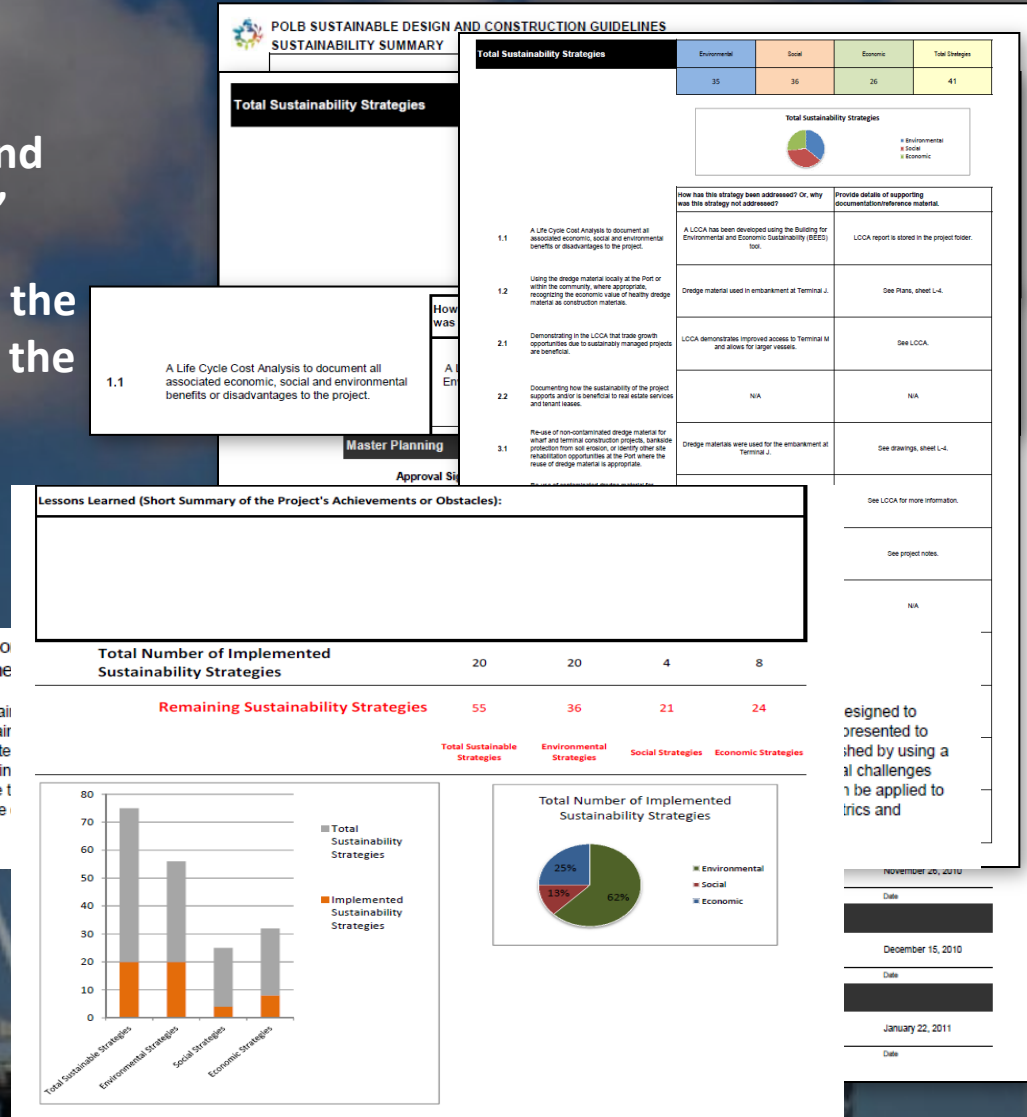
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 Digital Signature Date

POLB Sustainable Design & Construction Guidelines Summary Sheet

- Reporting & Metrics
- Documents project performance and serves as a simplified “report card”
- Sustainability Strategies applied to the project are tabulated at the end of the process
- Provides information on:
 - Involved Port staff
 - Project Scope
 - Overview of sustainability attributes/benefits
 - Documents lessons learned

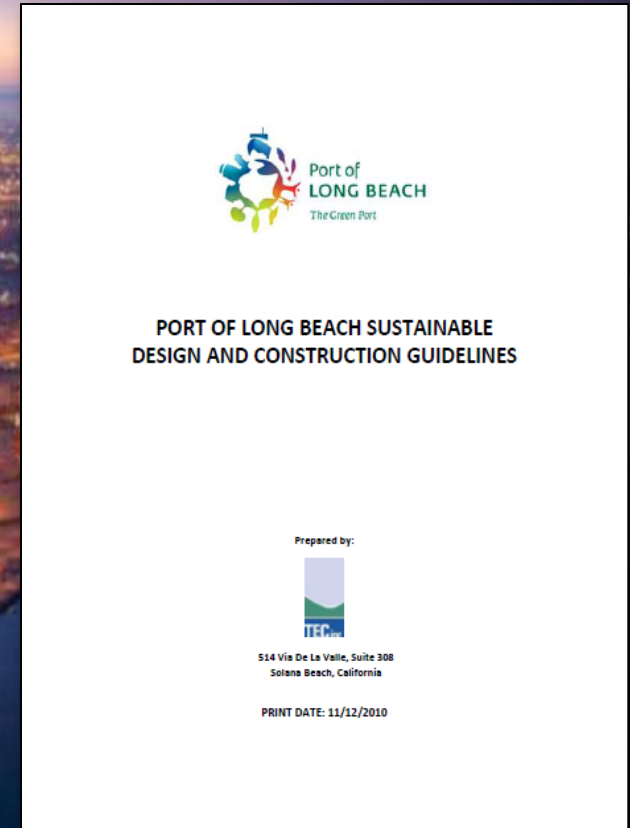
Lessons Learned (Show Sample Lessons Learned)

A challenge involved maintaining debris while maintaining the Team regarding accurate combination of tools, including other freshwater and marine process quality control.



POLB Sustainable Design & Construction Guidelines

Guiding Principles



A specific rating system for POLB projects...
is it adaptable?



Sustainable Design and Construction Guidelines for Ports

RALPH GRAVES, P.E., PhD, M. ASCE



Port of
LONG BEACH
The Green Port

PORTS '13

Why Another Set of Guidelines?

The Issue

- West Coast ports want to be environmentally friendly and sustainable.
- Which strategies make the best investments?
- How do ports know that they have considered all possible options?
- How can we measure our accomplishments?

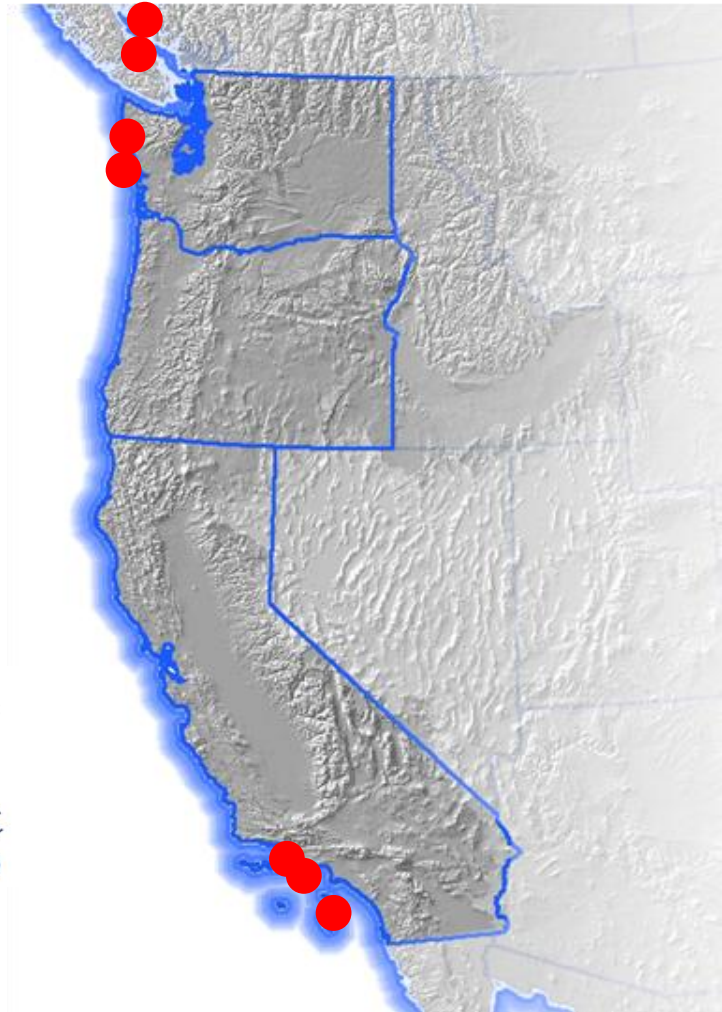
Prior Progress

- Communities want to see environmental results.
- Leaders have made policy declarations.
- Some procedures and plans in place.
- Isolated but not consistent project results.
- Organizational challenges.

We Form a Team

- Portland and Long Beach invite others.
- Los Angeles, San Diego, Vancouver, Tacoma, and Seattle join.
- First meeting in February 2011.
- Adopted a charter to develop Sustainable Design and Construction Guidelines for port industrial development.

Joint West Coast Port Technical Committee



A Unified System Needed

Other Systems

- Hundreds of systems exist
- Most are sector or geographic specific
- LEED tailored to buildings.
- Nothing tailored to ports specifically

Relationship to Other Rating Systems



Desired Characteristics in the Products

- Define sustainable marine industrial development at the project level;
- Allow for flexibility and adaptability by individual ports;
- Build upon the sharing of best practices and lessons learned;
- Identify options and opportunities “beyond compliance”;
- Establish objective guidance and measurement of port sustainability;
- Provide a consistent approach the port enterprise;
- Establish a common language that is understood by stakeholders; and
- Enhance the overall efficiency, productivity, and environmental performance of each port without disadvantage or limitation to the other ports.

General Checklist

- Air
- Public outreach
- Water
- Natural resources
- Economic considerations
- Economic growth
- Transport
- Site development
- Safety & security
- Waste
- Energy
- Materials
- Maintenance/monitoring/reporting

General Checklist Examples

- Consider using earth movers and import haulers with a gross vehicle weight rating (GVWR) of at least 19,500 lbs that comply with USEPA 2004 on-road emission standards for PM10 and NOx.
- Host a meeting or panel discussion for affected communities, separate from the public hearing, as an opportunity for more dialogue.
- Design for collection of runoff from pollution generating surfaces and provide stormwater treatment, including over-water areas.
- Replace conventional shoreline armoring with alternative bankline protection methods to improve ecological functions.

Project-Specific Checklists

- Dredging - Create shoreline recreation areas or shallow marine habitat where future Port development is not anticipated to offset impacts.
- Wharf construction - Specify the use of life-extending technologies where applicable (e.g., rubberized pavements, low pH silkcoat).
- Roadways, rails and bridges - For railway construction, consider use of alternative materials (concrete or plastic ties).
- Landscaping - Incorporate landscape measures to distract and discourage seabirds from concentrating in areas of impervious surfaces.
- Utilities - Utilize trenchless construction to reduce excavation areas, minimize site disturbance, and improve construction efficiency.
- Demolition - Reduce dust and particulate matter during demolition processes in excess of applicable regulations.
- Terminals - Incorporate electrical infrastructure upgrades during terminal construction and rehabilitation projects.
- Remediation - Specify the use of natural processes for remediation.

Joint West Coast Port Technical Committee

Excel Tool Screen Shot

Excel Tool Screen Shot

Project Area: **Land Development**
 Focus Area: **Safety & Security** [Add New Strategy](#) [Go to Start Page](#) [Summary Reports](#)

Focus Area	Focus Areas	Strategy	Implemented ?	Why Not Implemented/ Why Not Applicable?	Supporting Details	Resources for Additional Information	Strategy Weight	Economic	Environmental	Social
Strategies Required by Regulation <i>Ports, please enter sustainability strategies here which are required by Port or local regulations.</i>										
Strategies Under Consideration <i>Project Managers, please select additional sustainability strategies that you have considered for your project.</i>										
Air		Consider using harbor craft with Tier 3 engines or cleaner.								
Air		Consider reducing the speed of ships and barges delivering construction-related materials (12 knots for ocean-going vessels).								
Air		Consider requiring construction-related ships, barges, and marine equipment to use low sulfur or ultra low sulfur fuels where appropriate.	Yes				3	X		
Air		Trucks hauling material such as debris or fill material should be fully covered while operating off Port	Yes				4			X
Air		Minimize idling of construction equipment and on-road trucks used during construction .	Yes				5		X	
Air		Consider using on-road trucks with a gross vehicle weight rating (GVWR) of at least 19,500 lbs that comply with USEPA 2007 on-road engine standards for PM10 and NOx.	No							
Air		Consider using earth movers and import haulers with a gross vehicle weight rating (GVWR) of at least 19,500 lbs that comply with USEPA 2004 on-road emission standards for PM10 and NOx.	Not Applicable							

Please choose Yes, No, or Not Applicable from dropdown menu.

Joint West Coast Port Technical Committee Project Summary Report

[Go To Start Page](#)

SUMMARY REPORT

Select Project Area

Select Focus Area(s)

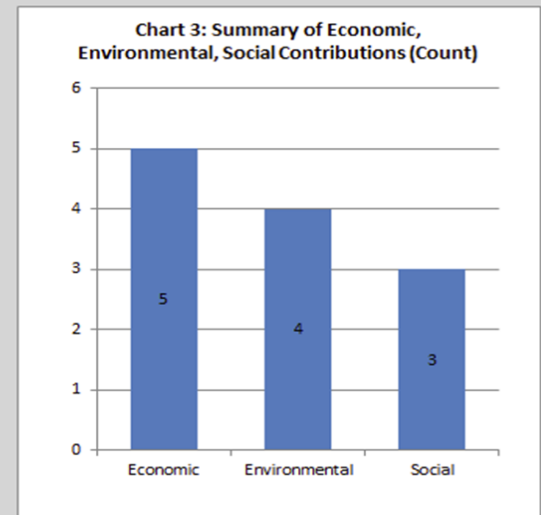
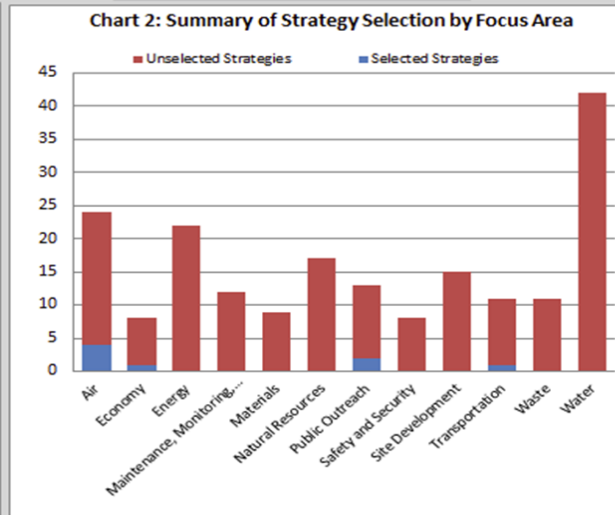
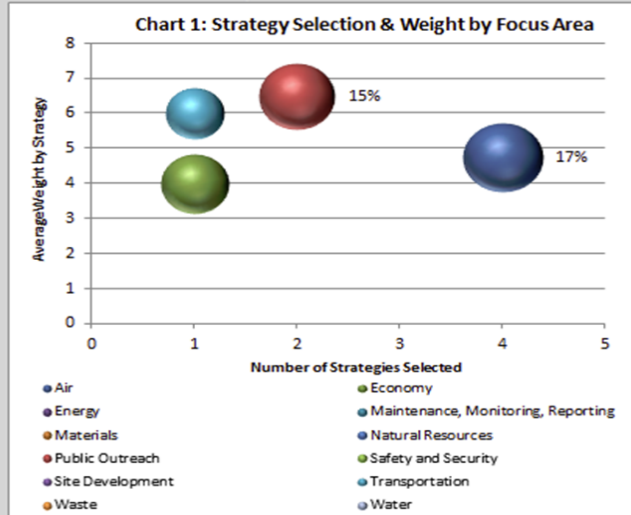
Go To List of Criteria Implemented

Print Selected Criteria

Summary Charts by Project Area

PROJECT AREA: Land Development

[Link to Chart Descriptions](#)



Summary Tables

Project Area	Focus Area	Summary of Selected Strategies	Percent Selected	Total Weighted Score	Contributions		
					Economic	Environmental	Social
Land Development	Air	4 out of 24 (17%)	17%	19	2	2	1
Land Development	Economy	1 out of 8 (13%)	13%	4	1	0	0
Land Development	Energy	0 out of 22 (0%)	0%	0	0	0	0
Land Development	Maintenance, Monitoring, Reporting	0 out of 12 (0%)	0%	0	0	0	0
Land Development	Materials	0 out of 9 (0%)	0%	0	0	0	0
Land Development	Natural Resources	0 out of 17 (0%)	0%	0	0	0	0
Land Development	Public Outreach	2 out of 13 (15%)	15%	13	1	1	2
Land Development	Safety and Security	0 out of 8 (0%)	0%	0	0	0	0
Land Development	Site Development	15 out of 15 (100%)	100%	15	5	4	3

Port of Long Beach Process Checklist

- A project's sustainability attributes are communicated and understood by all divisions involved in a project;
- The construction documents and specifications clearly identify the sustainability attributes of a project prior to bid to ensure that the project information is clearly communicated to the bidding contractors;
- The selected contractor is aware of the project's sustainability attributes; and
- Verification that the sustainable attributes were properly executed in the project upon completion and all implemented strategies are documented in the project file.

Next Steps

- San Diego Gas and Electric Company partially sponsored Excel tool that combines checklists.
- Post tool to AAPA website.
- Ongoing maintenance and collaboration to capture experience and identify best practices.

The *Envision*TM Rating System

The *Envision*TM Rating System

What makes a sustainable bridge?

Bill Bertera, Executive Director of ISI
Evan Sheesley, P.E., ENV SP, M. ASCE

Port of **LONG BEACH**

The **Envision**™ Rating System

The **Envision**™ Rating System



INSTITUTE FOR
SUSTAINABLE
INFRASTRUCTURE



ZOFNASS PROGRAM
FOR SUSTAINABLE INFRASTRUCTURE

 Graduate School of Design
Harvard University

What is **Envision**™?

PHASE TOOLKITS



Under Development

PRE-ASSESSMENT CHECKLIST



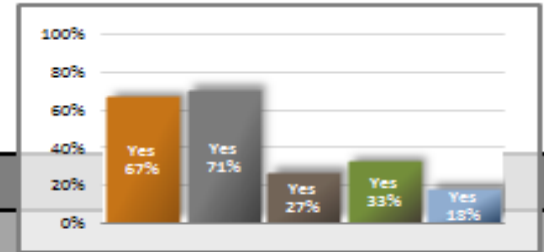
RECOGNITION ASSESSMENT



COMPANION TOOLS



Pre-Assessment Checklist



Leadership

1. Collaboration

LD1.1 Provide Effective Leadership and Commitment

Intent: Provide effective leadership and commitment to achieve project sustainability goals.

Metric: Demonstration of meaningful commitment of the project owner and the project team to the principles of sustainability and sustainable performance improvement.

Assessment Questions:

	Yes	No	N/A	
Has the project team issued public statements stating their commitment to sustainability?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	?
Is the project team's commitment to sustainability backed up by examples of actions taken or to be taken?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	?
Do these commitments and actions demonstrate sufficiently that sustainability is a core value of the project team?	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	?
Total	3 of 3			

LD 1.2 Establish a Sustainability Management System

Intent: Create a project management system that can manage the scope, scale, and complexity of a project seeking to improve sustainable performance.

Metric: The organizational policies, authorities, mechanisms, and business processes that have been put in place and the judgment that they are sufficient for the scope, scale, and complexity of the project.

Stage 2 Rating Tool

	Section and Objective Numbers	Objectives	Required for Project	Level Of Achievement	Score	Objective Available Points
QUALITY OF LIFE						
QL1	QL1.1	Improve community quality of life. Improve the net quality of life of all communities affected by the project and mitigate negative impacts to communities. details / guidance	YES	Restorative ▾	25	25
			Notes: <input type="text"/>			
	QL1.2	Stimulate sustainable growth and development. Support and stimulate sustainable growth and development, including improvements in job growth, capacity building, productivity, business attractiveness and livability. details / guidance	YES	Superior ▾	5	16
		Notes: <input type="text"/>				
	QL1.3	Develop local skills and capabilities. Expand the knowledge, skills and capacity of the community workforce to improve their ability to grow and develop. details / guidance	Assessor Decision Include ▾	Improved ▾	1	15
		Notes: <input type="text"/>				

Sections Total Summary

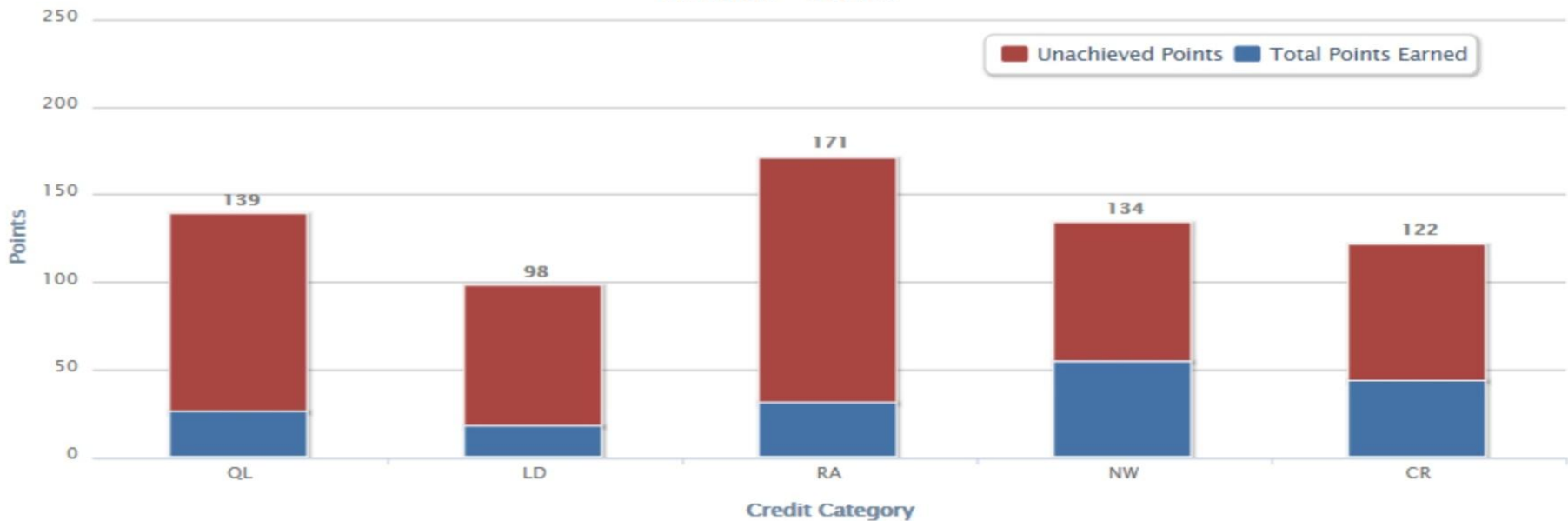
I want to:

View the Guidance Manual: [PDF](#) / [HTML](#)

Do You Need Help?

Credit Category	Applicable Points	Points	Innovation Points	Total Points Pursued	Percentage of Available Points
QUALITY OF LIFE	139	26	0	26	19%
LEADERSHIP	98	18	0	18	18%
RESOURCE ALLOCATION	171	31	0	31	18%
NATURAL WORLD	134	55	0	55	41%
CLIMATE AND RISK	122	44	0	44	36%
Total Workbook Points	664	174	0	174	26%

Envision™ Scores



Scope of Envision™



ENERGY

Geothermal
Hydroelectric
Nuclear
Coal
Natural Gas
Oil/Refinery
Wind
Solar
Biomass



WATER

Potable water distribution
Capture/Storage
Water Reuse
Storm Water Management
Flood Control



WASTE

Solid waste
Recycling
Hazardous
Waste
Collection & Transfer



TRANSPORT

Airports
Roads
Highways
Bikes
Pedestrians
Railways
Public Transit
Ports
Waterways



LANDSCAPE

Public Realm
Parks
Ecosystem
Services



INFORMATION

Telecommunications
Internet
Phones
Satellites
Data Centers
Sensors

60 Credits in 5 Categories



QUALITY OF LIFE

Purpose, Community, Wellbeing



LEADERSHIP

Collaboration, Management, Planning



RESOURCE ALLOCATION

Materials, Energy, Water



NATURAL WORLD

Siting, Land & Water, Biodiversity

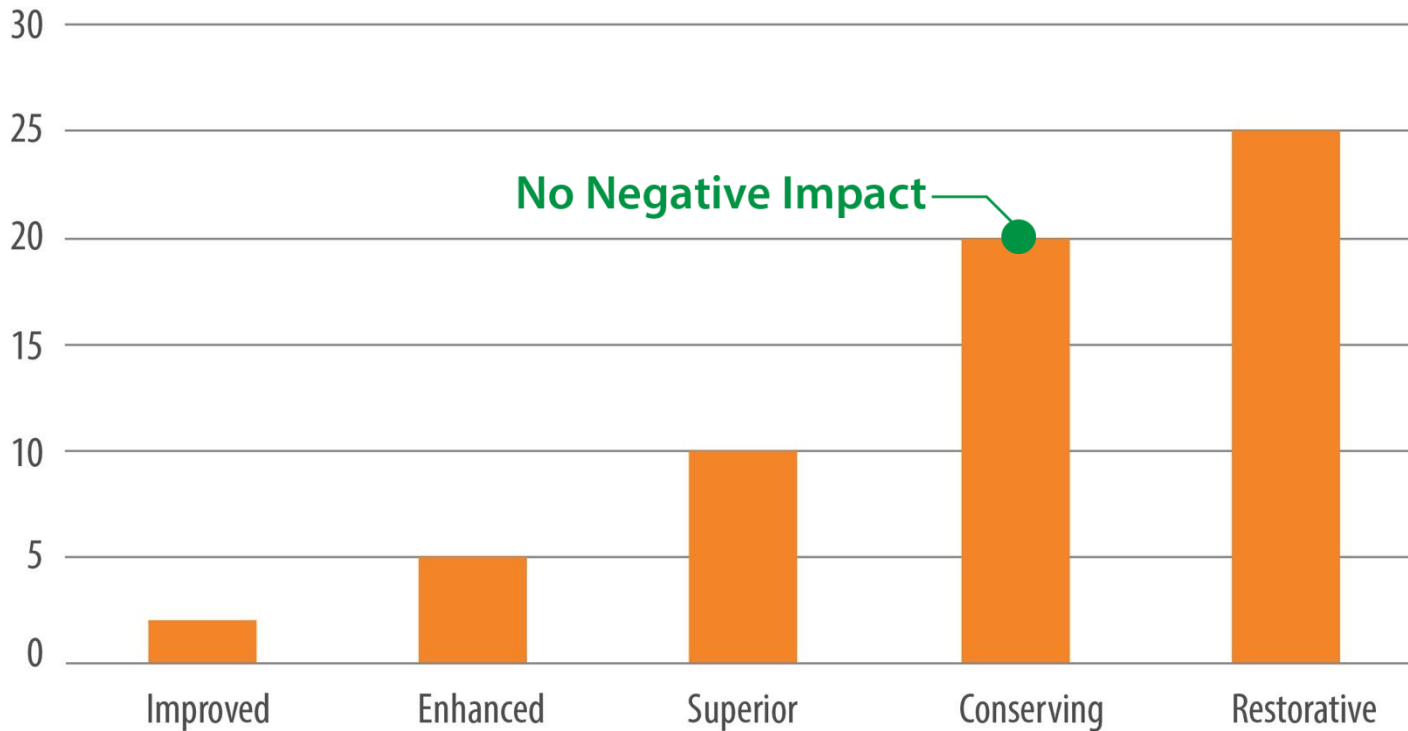


CLIMATE AND RISK

Emission, Resilience

Levels of Achievement

QL1.1 IMPROVE COMMUNITY QUALITY OF LIFE



Envision Assessment Criteria

Pathway Criteria

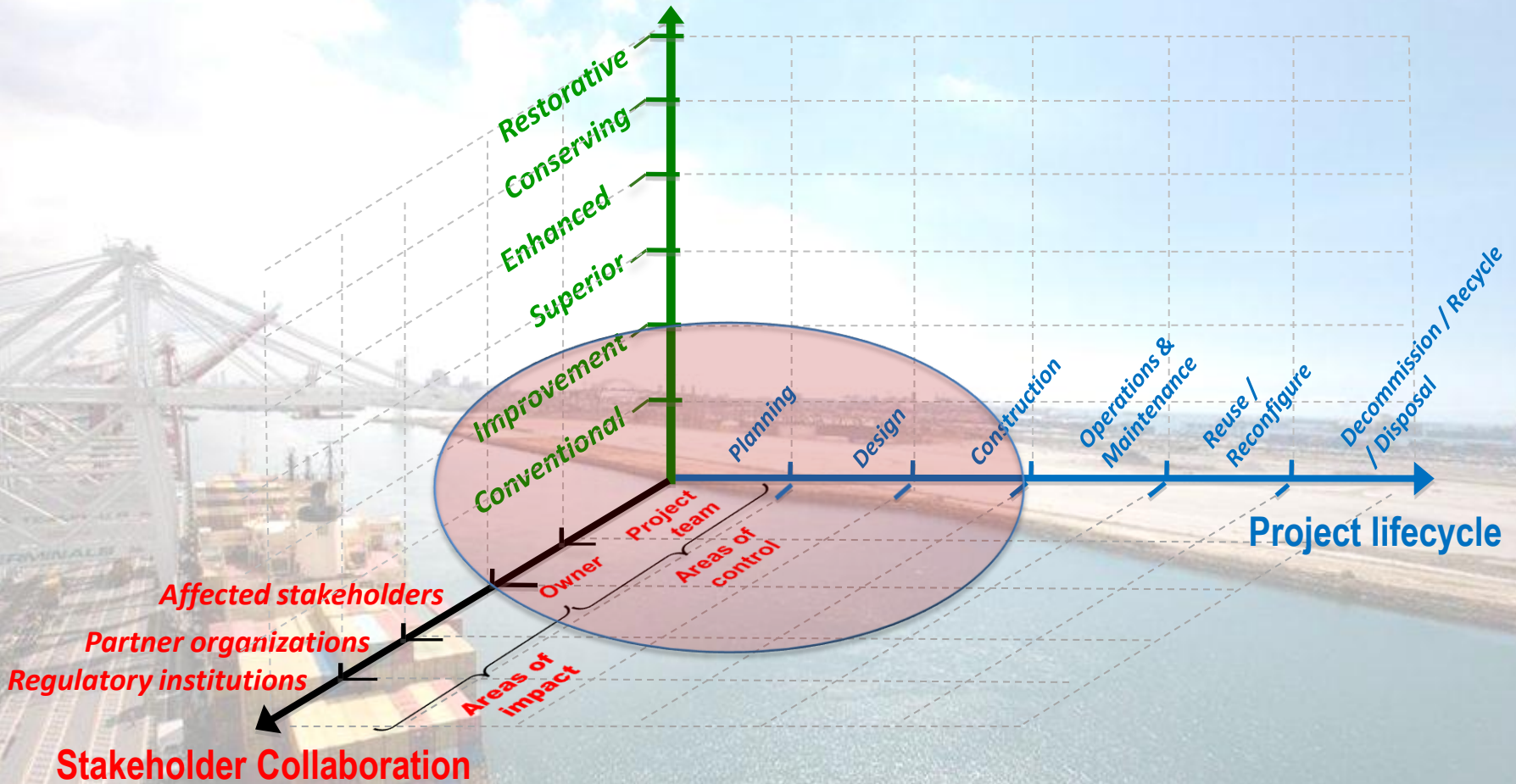
- Community Alignment
- Stimulate Growth and Development
- Improve Health and Safety
- Reduce Noise and Light Pollution
- Enhance Public Space

Performance Criteria

- Effective Leadership
- Infrastructure Integration
- Highly efficient, energy and material savings solutions
- Enhances natural environment
- Resilient and Adaptable
- Regional and Recycled Material
- Deconstruction/ Component reuse and recycle plans

Three Project Dimensions

Range of sustainable performance



Pilot Study



Pier A West Remediation Project

Pier A West Remediation



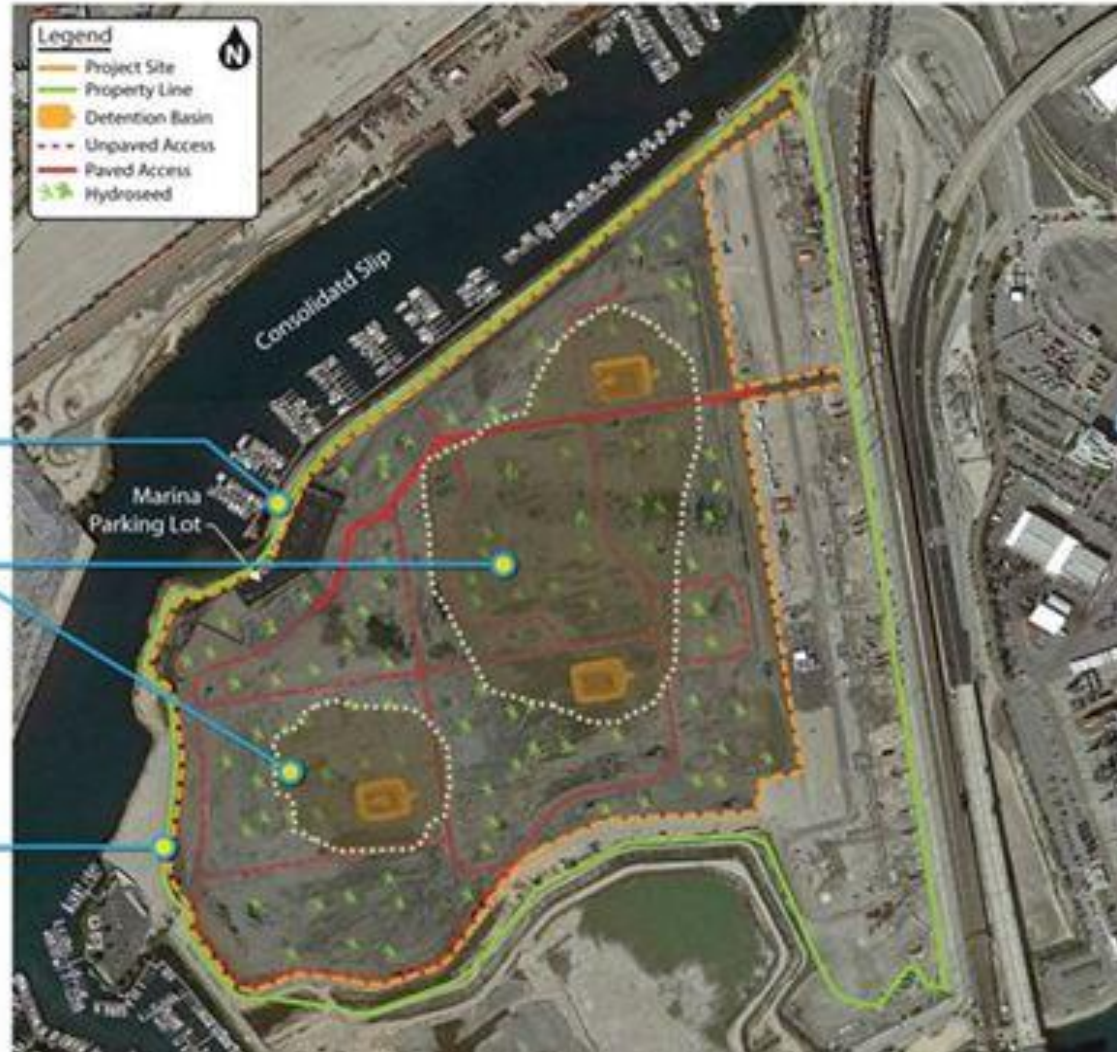
Project Goals

Improve Environment and Quality of Life

Improve Marina Access

Remove Contamination

Raise Ground Elevation



Pier A West Remediation

- Key Sustainability Strategies Applied to the Project:
 - Locally Resourced and Port Stockpiled Materials
 - Stormwater Management and On-site Capture
 - Minimized Site Disturbance
 - Minimized project derived wastes



Pier A West Remediation

Total Number of Implemented Sustainability Strategies

20

20

4

8

Remaining Sustainability Strategies

55

36

21

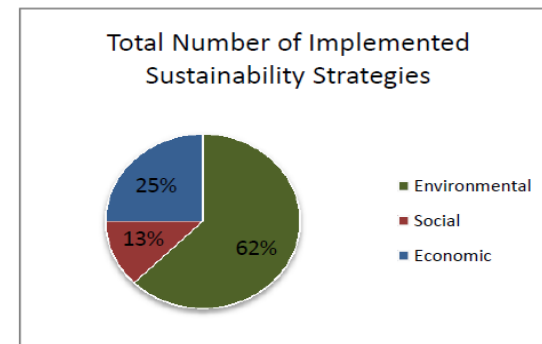
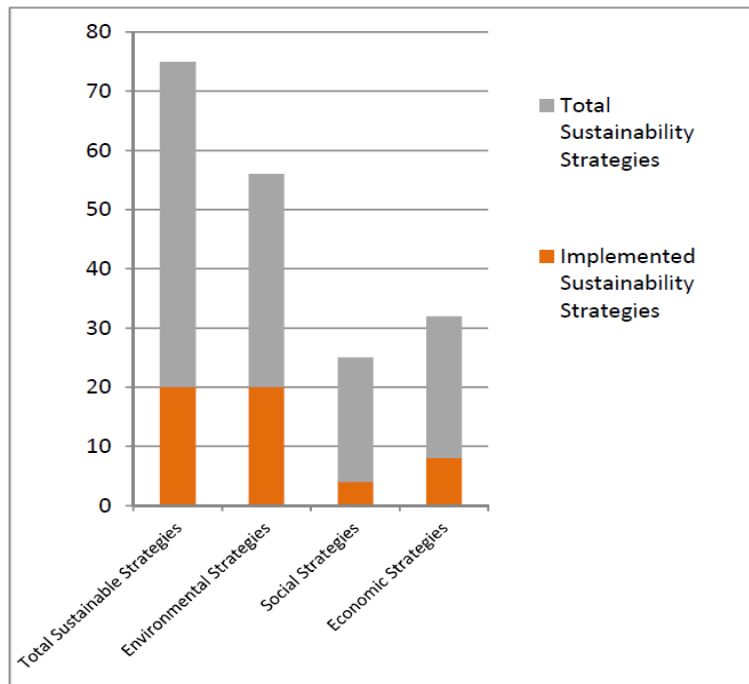
24

Total Sustainable Strategies

Environmental Strategies

Social Strategies

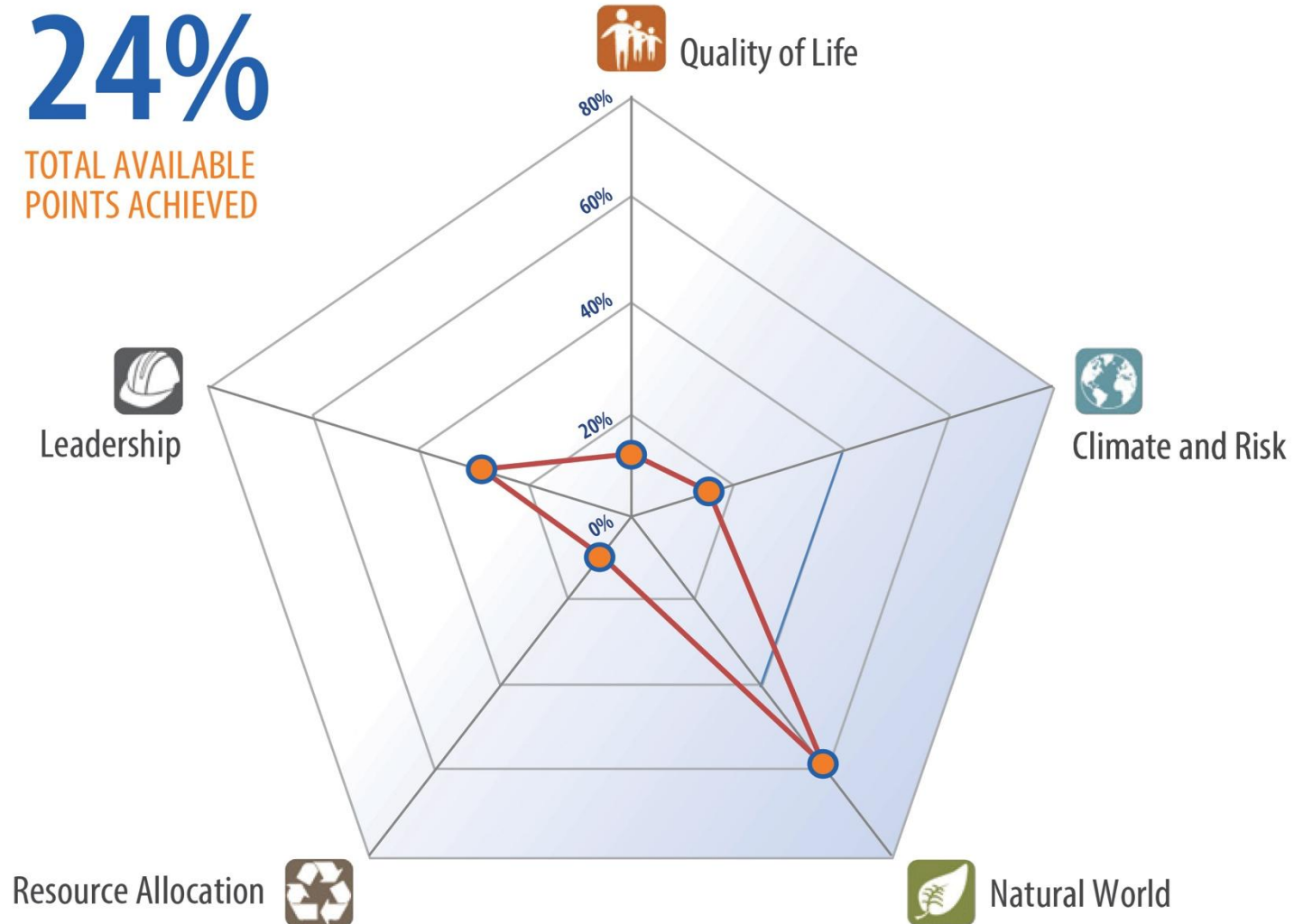
Economic Strategies



Pier A West Performance

24%

TOTAL AVAILABLE
POINTS ACHIEVED



Next Steps

What's on the horizon?

