INTEGRATING GREEN RATING SYSTEMS: A CASE STUDY FOR FERRY TERMINALS

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ABSTRACT

When attempting to achieve sustainability goals for integrated facilities, many green rating systems are available to guide the design, construction, operations and maintenance of a project. Due to the large number of sustainability tools that are available or mandated, it can be confusing to determine which set of guidelines to follow. For the Washington State Ferries (WSF), there is no green rating system which correlates perfectly with the unique intermodal challenges presented by ferry terminals. This paper focuses on five rating systems applicable to WSF: GreenLITES, LEED, Sustainable Sites Initiative, The Port Authority of NY/NJ Sustainable Infrastructure Guidelines (draft), and the draft Marine Vessel Environmental Performance Assessment (MVeP). These rating systems are integrated with a developing set of sustainable ferry guidelines in a green rating integration platform (GRIP). The GRIP readily relates credits and guidelines across multiple systems, aiding WSF in making decisions in accordance with sustainability goals. The GRIP format might similarly be applied to other integrated projects to more effectively and economically address sustainability across all aspects of projects and facility operations.

KEYWORDS

green rating systems, integrated facilities, sustainability

INTRODUCTION

Over the past decade, the concept of sustainability has become a rapidly and widely adopted goal in engineering. When developing new buildings and infrastructure, an emphasis is being placed on environmental, energy, and resource use goals for the design, construction, operations and maintenance of these facilities. To facilitate this focus, several different green rating systems and other forms of guidelines have been produced to provide a framework for the engineering, construction, and maintenance processes associated with infrastructure.

Due to the abundance of these rating systems and tools, there can be confusion in selecting the appropriate set of guidelines to use in any given situation. Gowri (2004) evaluates a variety of rating systems to compare the structure and design criteria between systems. He provides a brief summary of the systems available at that time, but does not evaluate further

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recommendations for decision making amongst the many options. Fowler and Rauch (2006) summarized sustainable building rating systems for the U.S. General Services Administration to help keep pace with the constantly changing and improving green building rating systems. Their work focused on federal building projects for which a specific set of criteria might be met, including applicability and quantifiable results. Their work is very comprehensive, but with the recent growth of rating systems, and the addition of infrastructure tools in recent years, would now need to be expanded upon and updated. Using a different approach, Fenner and Ryce (2008) compared two different rating systems applied to the same construction project and found that despite differing in application style and ranking format, the two systems provided similar assessments of the building. Each of these papers emphasize the fact that there are many green rating systems, and that it is useful, in some way, to determine which of them might be applied to attain specific goals or meet specified criteria. There is also a desire to determine how they might interrelate which each other, or be used conjointly. These studies also show that the depth of work that needs to be done in order to comprehensively compare each individually is large. Therefore there is a need to easily compare rating systems and facilitate the decision of choosing which green rating system or group of systems to follow for a specific project. The objective of this research is to develop a metric with which rating systems can be more easily compared and integrated to help facilitate green building goals.

Ferry terminals, like those owned and operated by Washington State Ferries (WSF) present multiple challenges to address unique site conditions, proximity to endangered aquatic species, service to communities, while accommodating multi-modal transportation systems. These conditions force WSF to address multiple environmental, social, and economic impacts relating to the design, construction, and operation of its facilities. In the near future, WSF will be challenged to address stormwater, site development, green building, and vessel operation goals that are all governed by different standards. Addressing these infrastructure goals will be directed by a set of sustainable ferry guidelines currently under development (De Sainte Marie D'Agneaux 2009).

As intermodal transportation facilities, ferry terminals present unique challenges in designing marine structures to accommodate buildings, automobiles, pedestrians, bicyclists and marine vessels. The facilities can be built over land, water, or a combination of both. Many of the sustainability challenges relate to the various transportation modes and the stormwater issues at the land/water interface. No single rating system specifically applies to the unique intermodal and structurally diverse situations occurring at ferry terminals, but several can be related to them in some form or fashion. While many rating systems may be partially applicable, the necessity to examine each one individually for every situation could become overwhelming. To integrate the use of different green rating systems and the proposed sustainable ferry guidelines, a Green Rating Integration Platform (GRIP) has been proposed in this research. The intended use of the GRIP is to aid strategic decision-making. According to Schwenk (1988), strategic decisions are for long-term objectives of an enterprise. They are often complex, ill structured, non-routine, and important to an organizational mission. Addressing these decisions might involve large resource commitments, but offer large gains or losses depending on the success of the outcome. These critical strategic operations cannot focus on only one functional area and therefore the approach must often be holistic in nature to achieve success. Thus, the GRIP provides a platform for integrating green rating systems to address organizational strategies for improving an enterprise's performance and public perception, while also considering sustainability and other facility goals.

While approaching an overall goal of developing fully harmonized integration tools to facilitate the use of multiple green design systems, we address two main objectives in these initial steps of the research: 1) Propose a simplified qualitative methodology for integrating rating systems and strategic decision categories or guidance for intermodal and multi-purpose facilities; 2) Apply this methodology for the development of a GRIP for ferry terminals.

BACKGROUND ON SUSTAINABILITY RATING SYSTEMS

There are many tools related to sustainability. These include rating systems, guidelines, regulations or codes and standards. Green rating systems are tools that are used to confirm a building or infrastructure project is being designed and built sustainably. They provide a metric to assess how sustainable a building or project is by assigning a representative value. This semi-quantitative metric will increase as more sustainable practices are implemented. The value of this metric is typically assigned based on how many credits or criteria the project meets. These credits often fall into a wide range of categories including site selection, water conservation, energy use, materials selection, and operations and maintenance. Each credit implemented earns points towards the value, which represents a sustainability measure for the project.

Guidelines differ from green rating systems. For guidelines, there is no metric established to rate the sustainability of the project. Guidelines are in place simply to establish guiding principles and suggest courses of action to meet the goal of building more sustainably. The Washington State University (WSU) Ferry Guidelines used in the GRIP provide a framework of sustainability practices specifically tailored for passenger ferry terminals. These guidelines will assist in allowing WSF to achieve their sustainability goals by identifying preventative or corrective measures in areas where sustainability can be improved.

Regulations are laws established by the government and must be followed regardless of the green design tools implemented. In the case of WSF, Washington State Department of Transportation (WSDOT) establishes the overriding regulations for permitting. Other sources of regulations may be imposed by the King County Surface Water Design Manual (King County 2009) and the Stormwater Management Manual for Western Washington (Seattle 2009). Finally, design standards such as applicable sections of the Washington State Public Building Requirements (SBCC 2009), the International Building Code (ICC 2009), and the International Green Building Code (ICC 2012) must be followed.

Consensus standards such as the American Standards for Testing and Materials (ASTM) or International Organization for Standardization (ISO) are sometimes referenced by green rating systems such as LEED to establish methods for assigning credits. These standards may be procedures used for quantifying measures of sustainability (e.g. energy use, carbon emissions, etc) and are used to ensure the common methods are universally employed. ISO has created series of environmental standards to provide a framework for organizations when they are creating environmental policy, plans, and actions (ISO 2011). This directly applies to WSF because the Safety Management System (SMS) employed by WSF has incorporated the environmental management system portion of the ISO 14000 set of standards. Complementary research is ongoing which includes the integration of the current WSF SMS with the current GRIP developed in this paper, but is not presented herein.

The focus of the GRIP methodology is to integrate green rating systems, which might be applicable to intermodal ferry facilities. A brief review of applicable systems is provided in the following.

One of the best-known green design ratings systems is Leadership in Energy and Environmental Design for new construction and major renovation (LEED NC), which has been developed by the US Green Building Council (USGBC 2009). This rating system applies primarily to conventional buildings, making it useful for the land side of a ferry terminal. LEED for retail is a subset of the LEED new construction system that is currently under pilot and presents a methodology for handling standard designs while providing additional guidance to parking issues and other criteria that address the site issues at a customer focused facility such as a WSF terminal.

Another rating system, which was developed by the Green Building Initiative, is Green Globes (GBI 2011). Green Globes easily applies to different project sizes, and both new and existing buildings. It has been specifically used for several public buildings. For ports, the most applicable sections are those that address building design and maintenance and operations. However, the similarly applicable LEED system is more commonly used in the United States.

The Sustainable Sites Initiative (SITES) is an interdisciplinary effort that provides guidelines for sustainability in the areas of land design, construction, and management (SSI 2009). It specifically addresses issues than may enhance social and community benefits of site development. When transferring the ideas presented in SITES to a WSF terminal, it is mainly applicable to the land side.

A good guidance for intermodal transportation issues is the Port Authority of NY and NJ Sustainable Infrastructure Guidelines (Port Authority). These guidelines are being developed for the purpose of addressing projects that occur outside the building envelope (TPA 2010). Due to this intermodal approach, the Port Authority applies quite well to the WSF system. The Port Authority is currently still in draft status and is still under development and review.

The New York State Department of Transportation has a rating system known as Green-LITES, designed to address multiple forms of transportation. GreenLITES lists different techniques used to measure sustainability performance in addition to promoting stormwater best management practices (BMPs), and possible areas of improvement in the planning, design, and construction phases. The main areas of focus are sustainable sites, water quality, materials and resources, and energy and atmosphere (NYDOT 2011). The tool is more readily applied to highways. GreenLITES use at WSF may be most applicable to the transportation network upland of the ferry terminal.

Another land side application which focuses on roads and highways is the Greenroads rating system. This system, like others, does a good job addressing stormwater treatment on roads which could apply to the landside area of a ferry terminal. In addition to stormwater, Greenroads also focuses on sustainable materials for new construction (Greenroads 2011). However, since the GreenLITES system is already being interfaced with the Port Authority of NY and NJ Sustainable Infrastructure Guidelines, and GreenLITES and Greenroads are very similar, GreenLITES was used for this case study.

The Federal Highway Administration of the US Department of Transportation has its own sustainability tool known as the Infrastructure Voluntary Evaluation Sustainability Tool (IN-VEST). As of this writing it is in the pilot test phase with version 1.0 scheduled to be released in 2012. This tool is expected to be available nationally and currently has three main sections focusing on systems and project planning, project development, and operations and maintenance (FHWA 2011). This tool is mainly focused on state and highway systems but may apply to the interface at the terminal including the upland roadway leading to the ferry terminal. When available, future research might bring this tool into the proposed platform format.

The Institute for Sustainable Infrastructure recently released version 1.0 of EnvISIon for feedback. EnvISIon is expected to be approved and available for use in early 2012. According to their announcement, EnvISIon evaluates the sustainability of a wide range of infrastructure projects vital to our communities, to economic competitiveness, and to protecting the environment (ISI 2011). When available, future research might also incorporate this tool into the proposed platform format.

Another sustainability checklist referring to transportation was developed by Lochner and is known as Sustainable Transportation Environmental Engineering and Design (STEED) guidelines. These guidelines mainly cover roadways and are separated into four stages: processing, planning, design, and construction (Lochner 2011). The State of Illinois also has a guidance which lists practices that bring sustainable results to highway projects known as the Illinois Livable and Sustainable Transportation (ILAST). However, as the GreenLITES system already covers most of the aspects represented in both of these highway rating systems (STEED and ILAST), and is being integrated with the Port Authority efforts, it remains the example system for this research.

The Marine Vessel Environmental Performance Assessment (MVeP), which is under development by the Society of Naval Architects and Marine Engineers (SNAME), applies to the waterside of WSF (SNAME 2010). MVeP is expected to be an excellent set of guidelines for marine vessels and can be implemented specifically for the ferries at WSF.

APPROACH

The first part of the research was outlining a methodology for GRIP development and future deployment. This was then followed by a case study application of the development portion of a GRIP for a ferry facility.

GRIP Methodology

The intention of the proposed GRIP methodology is to simplify the methodology and formatting that support strategic decision making related to sustainability decisions for intermodal facilities or any other development at the nexus of processes, projects, operations or facilities. For instance, there might be a GRIP developed for a building and the infrastructure servicing it, or for an airport with retail, security, buildings, supporting infrastructure, and multimodal transportation accessing the facility. The format used in the development of a GRIP, and then its synchronization techniques in order to facilitate application and use, are as listed in the following. This paper focuses on the first four steps, with an example given for the ferry intermodal facility application. Work on applying the fifth step for actual deployment for WSF is part of an ongoing continuation of the research.

- 1. Research and compile a set of applicable rating systems around the intermodal/multi-purpose facility.
- 2. Either based on previous studies, or through a combination literature review or focused study on the intermodal/multi-purpose facility, develop a preliminary set of GRIP categories.
- 3. Synchronize rating system categories to a preliminary set representing the intermodal/multi-purpose facility
- 4. Synthesize all credits to finalized GRIP categories

To achieve a fully harmonized version of GRIP, the various credits must be normalized to an equivalent basis to support comparative decisions. However, this step is beyond the scope of the current manuscript.

Ferry Facility Case Study

1: Rating Systems Chosen for WSF

As noted in the previous sections, five of the rating systems detailed in the sustainability rating systems literature review section were chosen as being applicable to WSF (Table 1). The GreenLITES system was chosen to focus on the area upland of the ferry terminals due to its applicability to multiple forms of transportation and its focus on highways, as well as its availability compared to many of the other rating systems with a focus on transportation. The next rating system was the LEED retail system for new construction. As one of the most well known and recognizable systems, it was important to include LEED. The LEED system is focused more on the landside of the ferry terminal, and also any terminal building that may be located on the trestle (overwater structure). Sustainable Sites Initiative was the third rating system chosen due to its excellent focus on stormwater management as well as integration of a construction project into a community. This rating system will also be more focused on the land side of the ferry terminal.

TABLE 1. Rating systems chosen for the Green Rating Integration Platform.

Rating System	Focus Area	Source
GreenLITES	Upland	New York DOT
LEED retail	Landside	US Green Building Council
Sustainable Sites Initiative	Landside	American Society of Landscape Architects; University of Texas; United States Botanical Garden
Sustainable Infrastructure Guidelines	Intermodal	Port Authority of NY/NJ
MVeP	Waterside	Society of Naval Architects and Marine Engineers

The draft Port Authority of NY/NJ Sustainable Infrastructure Guidelines was chosen due to its intermodal focus and thereby relevance to WSF. While they are still in draft status and not completely comprehensive, their focus on construction projects outside the building envelope make them valuable when developing a system for WSF. Finally, the MVeP guidelines were chosen for the marine side of ferry trestles due to their focus on water vessels.

2: Preliminary Ferry Guidance Category Selection

The sustainability guidance that the five rating systems were then integrated with was based on categories developed in previous work performed by Washington State University in 2009 for WSF (De Sainte Marie D'Agneaux 2009). This previous work focused on defining sustainable ferry infrastructures based on current practices, tools and policies, and activities performed; mainly through a literature review and interactions with WSF. In order to help ease understanding, the sustainable practices discussed in this previous work were divided into seven categories. Not all seven categories were given the same level of importance, but all categories

were considered to have a significant impact on ferry terminal sustainable infrastructure. The seven focus areas developed in this previous work are:

• Traffic and Parking

This section focuses on increasing capacity and customer satisfaction while decreasing the negative impacts of vehicles on the surrounding area.

• Integration in the Community

This category focuses on practices which supports positive impacts on the surrounding community in order to increase general acceptance. Some examples include reducing light and noise pollution and improving aesthetics of the terminal.

Energy Management

This category focuses on reducing energy use and energy related pollution while limiting the dependence on the energy grid.

• Water Management

This section focuses on both the use of potable water as well as limiting stormwater runoff.

Materials Management

This focus area attempts to limit the overall use of resources, and replace materials with reused and recycled options when possible.

Site Selection

This area focuses on the use of grayfield or brownfield sites where appropriate.

• *Air Quality*

This section focuses both on limiting the air pollution produced from the site as well as improving indoor air quality in any buildings on the site.

3: Category Synchronization and Synthesis of Credits

The GRIP methodology now synchronizes the categories from the five rating systems and the sustainability guidance format as developed for WSF in previous work. This synchronization was done in conjunction while evaluating each credit and prerequisite within the rating systems to determine a possible first best fit for each. In addition, there are often credits which may not directly fit into guidance categories as first developed, and expansion or modification of such categories might be necessary for synchronization. In this process, all credits and prerequisites in all the rating systems were maintained, although their distribution in focus categories may have changed. Table 2 has an overall listing of the rating systems and guidance, and the final category designations, which resulted from this process. The details for each major decision and overviews of the credit designations used in these determinations are described in more detail in the following paragraphs. Table 2 also includes a reference to spatial application of the rating system or guidance with respect to the facility, i.e. upland, landside, intermodal or marine side.

For the green rating integration research, the previously mentioned site selection category from the guidance work performed at WSU (De Sainte Marie D'Agneaux 2009) was renamed construction phase and expanded to include all aspects of construction instead of only being limited to site selection. The five rating systems were then separated into the aforementioned categories to help ease the integration across the systems. The process for re-categorization for each of the five rating systems in order to facilitate integration follows.

The GreenLITES rating system is divided into the five categories of sustainable sites (S), water quality (W), materials and resources (M), energy and atmosphere (E), and an unlisted

TABLE 2. Summary of Rating Systems, Guidance and Synchronized Categories.

	Upland GreenLites	Land Side LEED Retail	Land Side Sustainable Sites Initiative	Intermodal Port Authority	Intermodal WSU Ferry Guidelines	Marine Side MVeP
Traffic/Parking						
Community/ Social						
Energy						
Water	Credit and Prerequisite Integration Field					
Materials			•			
Air Quality						
Construction Phase						

innovation category. One of the sustainable sites credits fit well into the construction phased category while the other four address community/social aspects. The water quality and materials and resources sections transposed well into the water management and materials management sections of the GRIP respectively. Finally, the energy and atmosphere section has two credits that may correlate with the energy management section, two fit with traffic and parking, and two deal with community/social aspects. GreenLITES lacks credits that fit specifically into the air quality section (Figure 1).

The LEED retail system is divided into seven separate categories. The five main categories of sustainable sites (SS), water efficiency (WE), energy and atmosphere (EA), materials and resources (MR), and indoor environmental quality (IEQ) are joined by two other areas of innovation and regional priority. These two additional categories provide for flexibility and local needs in design and criteria and as such, when credits are established, they will fit into one of the five main categories. The sustainable sites category has credits applicable to four different sections outlined in the WSU Ferry Guidelines. Three of the credits address pollution prevention. Site selection fit well with the construction phase category. One credit addressing transportation went into the traffic/parking section while two stormwater credits fit best in the water management category. The majority (five) of the sustainable sites credits were placed in the community and social section. All four of the water efficiency prerequisites and credits transferred

FIGURE 1. GreenLITES credits organized by previously developed WSU Ferry Guidelines.

	Upland
	Green ITES
	E-1: Improve Traffic Flow
Traffic/Parking	E-4: Bicycle / Pede strian Facilities
	S-2: Context Sensitive Solutions
	+ S-3: Land Use Planning
	S-4: Protect Wildlife Habitat
Community/Social	+ S-5: Protect Plant Communities
	♦ E-5: Noise Abatement
	+ E-6: Stray Light Reduction
Г.,	♦ E-2: Reduce Electrical
Energy	◆ E-3: Reduce Petroleum
Water	♦ W-1: Stormwater Management
water	♦ W-2:BMPSs
	M -1: Reuse of Materials
	♦ M –2: Recycle content
Materials	♦ M -3: Locally Provided Material
	♦ M -4: Bioengineering Techniques
	♦ M –5: Hazardous M inimization
Air Quality	
All Quality	
Construction Phase	S-1: Alignment Selection
Constitution inase	

FIGURE 2. LEED Retail credits organized by previously developed WSU Ferry Guidelines.

	Land Side		
	LEEDretail		
Traffic/Parking	SSc4-Alternative Transportation		
Trairic/Tarking			
	SSc2-Community Connectivity		M Rp1–Recyclables
	SSc5.1-Protect or Restore Habitat		M Rc1.1—Building Reuse –Exterior
	SSc5.2-Maximize Open Space		M Rc1.2-Building Reuse-Interior
	♦ SSc7-Heat Island Effect		M Rc2-Waste Management
Community / Cocial	SSc8-Light Pollution Reduction	Materials	♦ MRc3-Materials Reuse
Community/Social	EAp3-Refrigerant Management	viale iais	M Rc4-Recycled Content
	EAc4-Refrigerant Management		♦ M Rc5-Regional Materials
	IEQc6-Controllability of Systems		 M Rc6-Rapidly Renewable Material
	IEQc7-Thermal Comfort		M Rc7–Cert if ied Wood
	IEQc8-Daylighting and Views		◆ IEQc4-Low-Emitting Materials
	 EAp2-M inimum Energy Performance 		♦ IEQp1-M inimum IAQ
	EAc1-Opt imize Energy	_	◆ IEQp2-ETS control
Energy	EAc2-On-site Rene wable Energy	Air Quality	IEQc1-Outdoor Air Monitoring
	♦ EAc5-Measurement and Verification	~ /	IEQc2-Increased Ventilation
	♦ EAc6-Green Power		IEQc5-Indoor Pollutant Control
	SSc6.1-Stormwater Quantity Control		SSp1-Pollution Prevention
	SSC6.2-Stormwater Quality Control		SSc1-Site Selection
\A/atan	WEp1-Water Use Reduction	Country sties Place	SSc3-Brownfield Redevelopment
Water	WEc1-Water Efficient Landscaping	Construction Phase	 EAp1-Fundamental Commissioning
	♦ WEc2-Innovative Technologies		♦ EAc3-Enhanced Commissioning
	WEc3-Water Use Reduction		IEQc3-Construction IAQ

over into the water management section. A majority of the energy and atmosphere credits went into the energy management section with the two atmosphere focused credits placed instead in the community/social section. Similar to the water efficiency section, all of the materials and resources credits fit into the materials management category. Finally, LEED indoor environmental quality was divided into five credits fitting into the air quality category, three fitting into community/social, and one credit in each of the material management and construction phase categories (Figure 2). Note that the LEED items in Figure 2 are also prefixed by either 'p' or 'c' after the two or three letter category reference. This represents prerequisite and credit respectively. Every single prerequisite is required for achieving a green rating system certification, while each project can use different combinations of credits to achieve the required number of points for certification.

Sustainable Sites Initiative (SITES) has the most categories in which the credits are divided into. The eight categories in the SITES rating system are: site selection (SS), assessment and planning (PD), water (W), soil and vegetation (SV), materials selection (MS), human health and well being (HH), construction (C), and operations and maintenance (OM). Similar to GreenLITES, the site selection category contains elements that transfer to both the community/social and construction phase sections of the WSU Ferry Guidelines. The assessment and planning category is technically pre-design but was included in the construction phase category. The water, materials, human health and well being, and construction sections transfer completely to the water management, materials management, community/social, and construction phase categories respectively. The soil and vegetation section contains elements which fit in each of the community/social, energy management, and construction phase categories. Finally, the operations and maintenance category contains BMPs involving energy management, water management, materials management, and air quality. The major-

ity of credits for the Sustainable Sites Initiative fit in the community/social category and none fall into the traffic/parking category (Figure 3). As in the LEED rating system, items in Figure 3 are also prefixed by either 'p' or 'c' after the category reference, standing for prerequisite and credit respectively.

The draft Port Authority of NY/NJ Sustainable Infrastructure Guidelines (Port Authority) has similar sections to the WSU Ferry Guidelines. This rating system is divided into six categories of site (IS), water (IW), energy (IE), materials (M), construction (IC), and maintenance and operations (IO). The site section is the only section of the six to be divided when transferred into the WSU Ferry Guidelines format. The Port Authority site section has credits which fall into the categories of traffic/parking, community/social, water management, materials management, and construction phase. The Port Authority water, energy, material, and construction sections fit into the water management, energy management, materials management, and construction phase categories in the WSU Ferry Guidelines. Finally, the maintenance and operations category deals with watering landscaping and is therefore placed in the water management category. The Port Authority rating system also does not have credits which fit directly into the air quality category (Figure 4).

FIGURE 3. Sustainable Sites Initiative credits organized by previously developed WSU Ferry Guidelines.

Guidelines.			
Traffic/Parking	Land Side Susta inable Sites Init iat ive	Water	Wp3.1-Reduce landscape irrigation Wc3.2-Reduce landscape irrigation Wc3.3-Protect/Restore buffers Wc3.4-Rehabilitate streams Wc3.5-Manage stormwater on site Wc3.6-On-site water resources Wc3.7-Use stormwater for landscape Wc3.8-Maintain water features
Traine/i arking			OM p8.1-Sustainable maintenance
Community/Social	SSp1.2-Protect floodplain functions SSp1.3-Preserve wetlands SSp1.4-Preserve wetlands SSp1.4-Preserve endangered species SSc1.6-Select sites in communities SSc1.7-Accessible to public transit SVp4.1-Control invasive plants SVp4.2-Use non-invasive plants SVp4.3-Soil management plan SVc4.5-Preserve special statusveg. SVc4.6-Daylighting and Views SVc4.7-Use native plants SVc4.9-Restore native plants SVc4.9-Restore native plants SVc4.12-Restore native plants	Materials	MSp5.1-Eliminate threatened wood MSc5.2-Maintain often MSc5.3-Design for deconstruction MSc5.4-Reuse salvaged materials MSc5.5-Recycled content materials MSc5.6-Use certified wood MSc5.7-Use regional materials MSc5.8-Reduce VOCemissions MSc5.9-Sustainable plant production MSc5.10-Sustainable manufacturing OMp8.2-Collect recyclables OMc8.3-Recycle organic matter OMc8.6-M inimize tobacco smoke
	SVc4.13-Reduce wildfire risk HHc6.1-Equitable site development	Air Quality	OM c8.7-M inimize greenhouse gases OM c8.8-Reduce emissions
	♦ HHc6.2–Equitable site use		
	Htt:6.3-Sustainability education Htt:6.4-Protect historical places Htt:6.5-Optimum site accessibility Htt:6.6-Outdoor physical activity Htt:6.7-Viewsof vegetation Htt:6.8-Outdoor spaces Htt:6.9-Reduce light pollution	Construction Phase	• cp/.1-corkioiconstructionpolicitants
			Cp7.2–Restore disturbed soils
Energy	SVc4.10-M inimize heating SVc4.11-M inimize cooling OM c8.4-Reduce energy consumption OM c8.5-Use rene wable energy		Cc7.3-Restore disturbed soils Cp7.4-Divert materials from disposal Cp7.5-Reuse soil Cp7.6-M inimize emissions

FIGURE 4. Port Authority of NY/NJ Sustainable Infrastructure Guidelines credits organized by previously developed WSU Ferry Guidelines.

	Intermodal		IS-10: Amend and Reuse Existing Soils
	Port Authority		♦ IS-11: Balance Earthwork
	IS-17: Optimize Traffic Safety		♦ IM -1: Use Recycled Materials
Traffic/Parking	IS-19: Enhance Intermodal Connectivity		◆ IM -2: Use Local/Regional Materials
Trairic/Farking	♦ IS-20:Transportation System Management		+ IM −3: Reuse Materials
	IS-21:Transportation Technologies	Materials	♦ IM -4: Use Durable Materials
	1,111,2,113		♦ IM -5:Sustainably Harvested Wood
	♦ 18-5: Protect Ecological Health		♦ IM –6: M inimize Toxic Materials
	IS-6: Maintain Absorbent Landscapes		◆ IM –7: Enhance Pavement Lifecycle
Community (Conicl	IS-8: Utilize Appropriate Vegetation		IM -8: Utilize Thin Surface Paving
Community/Social	♦ IS-14: Mitigate Heat Island Effect		♦ IM –9: Utilize WMA Technology
	IS-15:M inimize Light Pollution		
	IS-16: Optimize Public Environments	A: O	
		Air Quality	
	IE-1: Optimize Energy Performance		
	IE-2: Electrical and Mechanical Systems		IS-1: Integrated Team Approach
	+ IE-3: Utilize End Use Metering		IS-2: Prepare a Site Assessment
Energy	IE-4: Use On-Site Rene wable Energy		♦ IS-3: Previously Developed Sites
	IE-5: Protect Ozone Layer		IS-4: Known Contaminated Sites
	IE-6: Provide Alternative Fueling Stations	-6: Provide Alternative Fueling Stations	
			IS-13: Utilize Trenchless Technology
	IS-7: Utilize Pervious Pavement	C	IS-18: Roadway Alignment Section
	+ IS-9: Use TurfgrassAppropriately	Construction Phase	◆ IC-1: M inimize Pollution
	◆ IW –1: Implement Stormwater BM Ps		IC-2: Protect Existing Natural Systems
NA / - A	IW -2: Implement Rainwater Neutrality		IC-3: Transportation Management
Water	◆ IW –3: Reduce Use of Potable Water		IC-4: Green Construction Equipment
	→ NV –4: Utilize End Use Metering		IC-5: Reduce Noise and Vibration
	♦ 10-1:Sustainable Landscape Maintenance		→ IC-6:Waste Management
	+ 10-2: Maintain Soil Quality		IC-7: Integrated Pest Management
	Quantity (

The MVeP rating system, which is focused on vessels and waterside, is divided into the four categories of energy efficiency (EE), air emissions (AE), water emissions (WE), and general measures (GM). The energy efficiency and water emissions can be placed entirely within energy management and water management respectively. The air emissions category fits mostly into the air quality category with one credit addressing ozone depletion fitting into the community/social category. Finally the general measures section contains credits which fit into the community/social, water management, and materials management categories. There are no credits regarding vessels which fit into traffic/parking or construction phase categories (Figure 5).

Finally, the five ratings systems and the aforementioned credits in the proposed WSF sustainability guidelines were consolidated into the seven tier green rating integration platform as shown in Figure 6 (Thompson 2011). Note that there is still additional detail within each category (row) and each rating system/guidance (column) that is not shown in the consolidated GRIP in Figure 6. These additional criteria, practices or considerations are meant to be applied in detail within each category, and then brought forth into the GRIP for integration across the sustainability goal platform.

Figure 6, the consolidated GRIP, is a visual representation of enterprise or agency goal categories such as energy or material management, with direct view of sustainable achievement potential and a summary listing of typical intents or strategies. Thus, the GRIP is a form of strategic decision-making conceptualization. As previously mentioned, strategic decision-making is not the details of the work, but rather composites of the overall direction.

♦ WE1-Oily Water ♦ WE2-Non-IndigenousSpecies ♦ WE2.1-Ballast Water/Sediment Marine Side WE2.2-Hull Fouling **MVeP** Water ♦ WE3-Sanitary Systems Traffic/Parking WF4-Solid Waste WE5-Incidental Discharges GM 3.1-Aquatic Life Impact ♦ WE6-Protection of Oil Community/Social ♦ GM 2-Hotel Water Use GM 3.2-Shore Protection AE6-Ozone-Depleting GM 1-Materials **Materials** • EE1.1-Lighting ♦ GM 4-Inventory Program ◆ GM 5-Ship Recycling EE1.2-HVAC EE1.3—Pump Systems ◆ AE1-NOx Reductions EE1.4-Mechanical Equipment

Air Quality

Construction Phase

♦ AF2-Sox Reductions

◆ AB-PM Reductions

♦ AE7-Port Air Emissions

◆ AE4-V0C
 ◆ AF5-GHGs

FIGURE 5. MVeP credits organized by previously developed WSU Ferry Guidelines.

◆ EE1.5-Hull/Propeller
 ◆ EE1.6-Route Optimization

EE1.7-VesselSpeed

EE2.1-Other Fuels
EE2.2-Rene wable Energies

EE3-Carbon Footprint

EE1.8-Energy Recovery
EE1.9-Hull Optimization

Specific actions would then follow by using the previous figures as bases for detailed analyses and further refinement of the GRIP process, both on the higher level and also within the organizational workings of the agency or enterprise.

One possible scenario in which the GRIP could be useful is when deciding which rating system to pursue. If certain sustainability practices have already been established for a given project, the GRIP can be used to compare the sustainability practices across multiple rating systems to see how many credits the project is eligible for, allowing for a more effective pursuit of green rating systems achievements. Another situation in which the GRIP may prove useful is when a project is required to follow multiple rating systems covered in the GRIP. By being able to compare credits side by side, it could be easier to determine how a single sustainable practice may fulfill multiple credits across multiple systems.

FUTURE RESEARCH

Energy

The GRIP presented in the research currently integrates five rating systems relevant to intermodal facilities as well as a set of guidelines for ferry terminals previously developed by WSU. Ideally, future work could be done to expand this integration beyond simply green rating systems and guidelines to include regulations and standards as well. With this integration setup one can quickly see how the credits relate across rating systems. It is a simple spreadsheet approach for managing communication across complex organizational and project related sustainability goals and criteria. This spreadsheet only shows the title of each credit; more detailed management practices of each credit for the rating systems may be obtained from the rating systems themselves and are intended to be applied within each category.

FIGURE 6. Green Rating Integration Platform for WSF.

Upland		Land Side	Intermodal	Intermodal	Marine Side
GreenLITES	LEEDretail	Sustainable Sites Initiative	Port Authority	WSU Ferry Guidelines	MVeP
☐ E-1: Improve Traffic Flow	☐ SSc4-Alternative Transportation		☐ IS-17: Optimize Traffic Safety	□ Promote HOV	
☐ E-4: Bicycle / Pede strian Facilities				□ Encourage walk-ons	
			☐ IS-20:Transportation System Management		
			☐ IS-21: Transportation Technologies	☐ Facilitate drop-off	
				□ Park-and-ride program	
				□ Shared-car program □ Optimize traffic flow	
				□ Reservation system	
				□ Peak periodsprices	
				☐ Allow future growth	
				2 Allow rate grown	
☐ S-2: Context Sensitive Solutions	□ SSc2-Community Connectivity	SSp1.2-Protect floodplain functions	☐ IS-5: Protect Ecological Health	☐ Architecturally blend	☐ GM 3.1-Aquatic Life Impact
☐ S-3: Land Use Planning	☐ SSc5.1-Protect or Restore Habitat	☐ SSp1.3-Preserve wetlands	☐ IS-6: Maintain Absorbent Landscapes	□ Visitor center	☐ GM 3.2-Shore Protection
☐ S-4: Protect Wildlife Habitat	☐ SSc5.2-Maximize Open Space	☐ SSp1.4-Preserve endangered species	☐ IS-&:Utilize Appropriate Vegetation	□ Include guided tours	□ AE6-Ozone -Depleting
☐ S-5: Protect Plant Communities	☐ SSc7-Heat Island Effect	☐ SSc1.6-Select sites in communities	☐ IS-14: Mitigate Heat Island Effect	□ Prevent flood damage	
☐ E-5: Noise Abatement	☐ SSc8-Light Pollution Reduction	☐ SSc1.7-Accessible to public transit	☐ IS-15:M inimize Light Pollution	☐ Allow change in activity	
☐ E-6: Stray Light Reduction	□ EAp3-Refrigerant Management	☐ SVp4.1-Control invasive plants	☐ IS-16: Optimize Public Environments	☐ No ozone depleting substances	
	☐ EAc4-Refrigerant Management	SVp4.2-Use non-invasive plants		☐ Light Pollution Prevention	
	□ IEQc6-Controllability of Systems	□ SVp4.3-Soil management plan		□ Noise Pollution Prevention	
	☐ IEQc7-Thermal Comfort ☐ IEQc8-Daylighting and Views	☐ SVc4.5-Preserve special statusveg. ☐ SVc4.6-Daylighting and Views		□ Wildlife Considerations	
	i iegeo-tayiigikii gaiki views	☐ SVc4.7-Use native plants			
		SVc4.8-Preserve native plants			
		SVc4.9-Restore native plants			
		□ SVc4.12-Reduce heat island effect			
		□ SVc4.13-Reduce wildfire risk			
		☐ HH:6.1-Equitable site development			
		☐ HH::6.2-Equitable site use			
		☐ HH:6.3-Sustainability education			
		☐ HH: 6.4-Protect historical places			
		□ HH::6.5-Opt imum site accessibility			
		☐ HH: 6.6-Outdoor physical activity			
		☐ HH:6.7-Viewsof vegetation			
		☐ HH:6.8-Outdoor spaces			
		□ HH:6.9-Reduce light pollution			
□ E-2: Reduce Electrical	EAn2-Minimum States Parformer	SVc4 10-Minimim heating	II IE-1: Ortinin Frage: Perfermence	☐ Produce rene wable energy	n FFI 1-Jirleine
☐ E-2: Reduce Electrical ☐ E-3: Reduce Petroleum	☐ EAp2-M inimum Energy Performance ☐ EAc1-Optimize Energy	SVc4.10-M inimize heating SVc4.11-M inimize cooling	☐ IE-1: Optimize Energy Performance ☐ IE-2: Electrical and Mechanical Systems	Produce rene wable energy Use waste heat from engine	□ EE1.1-Lighting □ EE1.2-HVAC
L L-X Reduce red ordin	☐ EAc2-On-site Renewable Energy		□ IE-3: Utilize End Use Metering	☐ Use localmaterial	☐ EE1.3-Pump Systems
	☐ EAc5-Measurement and Verification		☐ IE-4: Use On-Site Renewable Energy	☐ Minimal embodied energy	☐ EE1.4-Mechanical Equipment
	☐ EAc6-Green Power		□ IE-5: Protect Ozone Laver	□ Daylight harvesting	□ EE1.5-Hull/Propeller
			☐ IE-6: Provide Alternative Fueling Stations	☐ High-efficiency systems	☐ EE1.6-Route Optimization
				☐ Individual control in offices	□ EE1.7-VesselSpeed
				☐ Automatic control in public	☐ EE1.8-Energy Recovery
				☐ Automatically turn off lights	☐ EE1.9-Hull Opt imization
				☐ High reflectance	☐ EE2.1-Other Fuels
					☐ EE2.2-Rene wable Energies
					☐ EE3-Carbon Footprint
□ W-1: Stormwater Management	TO COLO 1 Chammana Company Control		☐ IS-7: Utilize Pervious Pavement		
				☐ Emergency plan for spills	□ WE1-Oily Water
□ W-2:BM PSs	SSC6.2-Stormwater Quality Control	□ Wc3.2-Reduce landscape irrigation	☐ IS-9: Use TurfgrassAppropriately	☐ Oil separat ion equipment	☐ WE2-Non-IndigenousSpecies
	SSC6.2-Stormwater Quality Control Wip1-Water Use Reduction	□ Wc3.2-Reduce landscape irrigation □ Wc3.3-Protect/Restore buffers	□ IS-9: Use TurfgrassAppropriately □ IW-1: Implement Stormwater BM Ps	Oil separation equipment Nontoxic paint	 □ WE2-Non-IndigenousSpecies □ WE2.1-Ballast Water/Sedime
	SSC6.2-Stormwater Quality Control Wfp1-Water Use Reduction Wfc1-Water Efficient Landscaping	□ Wc3.2-Reduce landscape irrigation □ Wc3.3-Protect /Restore buffers □ Wc3.4-Rehabilitate streams	□ IS-9: Use Turfgrass Appropriately □ IW-1: Implement Stormwater BM Ps □ IW-2: Implement Rainwater Neutrality	□ Oil separation equipment □ Nontoxic paint □ High-efficiency fixtures	☐ WE2-Non-IndigenousSpecies☐ WE2.1-Ballast Water/Sedime☐ WE2.2-Hull Fouling
	SSC6, 2-Stormwater Quality Control Wip1-Water Use Reduction WEc1-Water Efficient Landscaping WEc2-Innovative Technologies	□ Wc3.2-Reduce landscape irrigation □ Wc3.3-Protect/Restore buffers □ Wc3.4-Rehabilitate streams □ Wc3.5-Manage stormwater on site	□ IS-9: Use Turfgrass Appropriately □ IW-1: Implement Stormwater BM Ps □ IW-2: Implement Rainwater Neutrality □ IW-3: Reduce Use of Potable Water	Oil separation equipment Nontoxic paint High-efficiency fixtures Prevent leaks	■ WE2-Non-IndigenousSpecies ■ WE2.1-Ballast Water/Sedime ■ WE2.2-Hull Fouling ■ WE3-Sanitary Systems
	SSC6.2-Stormwater Quality Control Wfp1-Water Use Reduction Wfc1-Water Efficient Landscaping	Wc3.2-Reduce landscape irrigation Wc3.3-Protect/Restore buffers Wc3.4-Rehabilitate streams Wc3.5-Manage stormwater on site Wc3.6-On-site water resources	S-9: Use TurfgrassAppropriately W-1: Implement Stormwater BM Ps W-2: Implement Rainwater Neutrality W-3: Reduce Use of Potable Water W-4: Utilize End Use Metering	Oil separation equipment Nontoxic paint High-efficiency fixtures Prevent leaks Reduce potable water	□ WE2-Non-IndigenousSpecies □ WE2.1-Ballast Water/Sedime □ WE2.2-Hull Fouling □ WE3-Sanitary Systems □ WE4-Solid Waste
	SSC6, 2-Stormwater Quality Control Wip1-Water Use Reduction WEc1-Water Efficient Landscaping WEc2-Innovative Technologies	Wc3.2-Reduce landscape irrigation Wc3.3-Protect/Restore buffers Wc3.4-Rehabilitate streams Wc3.5-Manage stormwater on site Wc3.6-On-site water resources Wc3.7-Use stormwater for landscape	B-& Use Turfgrass Appropriately W-1: Implement Stormwater BM Ps W-2: Implement Rainwater Neutrality W-3: Reduce Use of Potable Water W-4: Itilize End Use Metering ID-1:Sustainable Landscape Maintenance	Oil separation equipment Nontoxic paint High-efficiency fixtures Prevent leaks Reduce potable water Reduce city water	□ WE2-Non-IndigenousSpecies □ WE2.1-Balla.t Water/Sedime □ WE2.2-Hull Fouling □ WE3-Sankary Systems □ WE4-Solid Waste □ WE5-Incidental Discharges
	SSC6, 2-Stormwater Quality Control Wip1-Water Use Reduction WEc1-Water Efficient Landscaping WEc2-Innovative Technologies	Wc3.2-Reduce landscape irrigation Wc3.3-Protect/Restore buffers Wc3.4-Rehabilitate streams Wc3.5-Manage stormwater on site Wc3.6-On-site water resources	S-9: Use TurfgrassAppropriately W-1: Implement Stormwater BM Ps W-2: Implement Rainwater Neutrality W-3: Reduce Use of Potable Water W-4: Utilize End Use Metering	Oil separation equipment Nontoxic paint High-efficiency fixtures Prevent leaks Reduce potable water	□ WE2-Non-IndigenousSpecies □ WE2.1-Ballast Water/Sedime □ WE2.2-Hull Fouling □ WE3-Sanitary Systems □ WE4-Solid Waste
	SSC6, 2-Stormwater Quality Control Wip1-Water Use Reduction WEc1-Water Efficient Landscaping WEc2-Innovative Technologies	□ Wc3.2-Reduce landscape irrigation □ Wc3.3-Protect /Restore buffers □ Wc3.4-Redublitate streams □ Wc3.5-Manage stormwater on site □ Wc3.6-On-site water resources □ Wc3.7-Use tormwater for landscape □ Wc3.8-Maintain water feetures	B-& Use Turfgrass Appropriately W-1: Implement Stormwater BM Ps W-2: Implement Rainwater Neutrality W-3: Reduce Use of Potable Water W-4: Itilize End Use Metering ID-1:Sustainable Landscape Maintenance	Oil separation equipment Nontoxic paint Figh-efficiency fixtures Prevent leaks Reduce potable water Reduce city water Treat waste water on-site	WE2-Non-IndigenousSpecies WE2.1-Ballax Water/Sedime WE2.2-Hull fouling WE3-Sanitary Systems WE4-Solid Waste WE5-Incidental Discharges WE6-Protection of Oil
	SSC6, 2-Stormwater Quality Control Wip1-Water Use Reduction WEc1-Water Efficient Landscaping WEc2-Innovative Technologies	□ Wc3.2-Reduce landscape irrigation □ Wc3.3-Protect /Restore buffers □ Wc3.4-Redublitate streams □ Wc3.5-Manage stormwater on site □ Wc3.6-On-site water resources □ Wc3.7-Use tormwater for landscape □ Wc3.8-Maintain water feetures	B-& Use Turfgrass Appropriately W-1: Implement Stormwater BM Ps W-2: Implement Rainwater Neutrality W-3: Reduce Use of Potable Water W-4: Itilize End Use Metering ID-1:Sustainable Landscape Maintenance	Oil separation equipment Nontoxic paint High-efficiency fixtures Frevent kaks Reduce potable water Reduce cky water Treat waste water on-site Implement UIS	WE2-Non-Indigenous Species WE2.1-Balla & Water/Sedime WE2.2-Hull Fouling WE3-Sanitary Systems WE4-Solid Waste WE5-Incidental Discharges WE6-Protection of Oil
	SSC6, 2-Stormwater Quality Control Wip1-Water Use Reduction WEc1-Water Efficient Landscaping WEc2-Innovative Technologies	□ Wc3.2-Reduce landscape irrigation □ Wc3.3-Protect /Restore buffers □ Wc3.4-Redublitate streams □ Wc3.5-Manage stormwater on site □ Wc3.6-On-site water resources □ Wc3.7-Use tormwater for landscape □ Wc3.8-Maintain water feetures	B-& Use Turfgrass Appropriately W-1: Implement Stormwater BM Ps W-2: Implement Rainwater Neutrality W-3: Reduce Use of Potable Water W-4: Itilize End Use Metering ID-1:Sustainable Landscape Maintenance	Off separation equipment Nontoxic paint High-efficiency fixtures Prevent leaks Reduce potable water Reduce city water Treat wastewater on-site Implement UDS Collect runoff /rainwater	WE2-Non-IndigenousSpecies WE2.1-Ballax Water/Sedime WE2.2-Hull fouling WE3-Sanitary Systems WE4-Solid Waste WE5-Incidental Discharges WE6-Protection of Oil
	SSC6, 2-Stormwater Quality Control Wip1-Water Use Reduction WEc1-Water Efficient Landscaping WEc2-Innovative Technologies	□ Wc3.2-Reduce landscape irrigation □ Wc3.3-Protect /Restore buffers □ Wc3.4-Redublitate streams □ Wc3.5-Manage stormwater on site □ Wc3.6-On-site water resources □ Wc3.7-Use tormwater for landscape □ Wc3.8-Maintain water feetures	B-& Use Turfgrass Appropriately W-1: Implement Stormwater BM Ps W-2: Implement Rainwater Neutrality W-3: Reduce Use of Potable Water W-4: Itilize End Use Metering ID-1:Sustainable Landscape Maintenance	Oll separation equipment Nontoxic paint High-efficiency fixtures Prevent leaks Reduce potable water Reduce city water Treat waste water on-site Implement UDs Collect runoff fainwater Treat waster on-boat	WE2-Non-IndigenousSpecie: WE2.1-Ballax Water/Sedime WE2.2-Hull Fouling WE3-Sanitary Systems WE4-Solid Waste WE5-Incidental Discharges WE6-Protection of Oil
D W-2BMPSs	SSC6, 2-Stormwater Quality Control Wip1-Water Use Reduction WEc1-Water Efficient Landscaping WEc2-Innovative Technologies	□ Wc3.2-Reduce landscape irrigation □ Wc3.3-Protect /Restore buffers □ Wc3.4-Redublitate streams □ Wc3.5-Manage stormwater on site □ Wc3.6-On-site water resources □ Wc3.7-Use tormwater for landscape □ Wc3.8-Maintain water feetures	B-& Use Turfgrass Appropriately W-1: Implement Stormwater BM Ps W-2: Implement Rainwater Neutrality W-3: Reduce Use of Potable Water W-4: Itilize End Use Metering ID-1:Sustainable Landscape Maintenance	Oli separation equipment Nontoxic paint High-efficiency fotures Prevent leaks Prechae potable sater Reduce city water Treat waste water on-site Implement IUS Collect numoff /aniwater Treat water onbott Maintanballast tanks	WE2-Non-IndigenousSpecies WE2.1-Ballax Water/Sedime WE2.2-Hull fouling WE3-Sanitary Systems WE4-Solid Waste WE5-Incidental Discharges WE6-Protection of Oil
	SSCA2-Seamwater Quality Control Wip1-Water Use Reduction Wip1-Water Use Reduction Wip2-Honovative Technologies Wip2-Honovative Technologies Wip2-Water Use Reduction MR91-Recyclables	□ VG.32-Reduce bardscape trigation □ VG.33-Rehabilitate streams □ VG.34-Rehabilitate streams □ VG.35-Warape stormwater on Step VG.36-On-Stewarter on Step VG.36-On-Stewarter on Step VG.37-Use stormwater for landscape □ VG.37-Use stormwater for landscape □ VG.38-Wastrah under features □ OMp B. 1-Sustainable maintenance	□ S-2: Use Turfg-as: Appropriately □ N-2: Implement Sommsater BM Ps □ N-2: Implement Rainsater Heatrality □ N-3: Reduce Use of Potable Water N-4: Utilize Brut Use Metering □ 10-3: Suttainable Landscape Maintenance □ 10-2: Maintain Soil Quality	Oli separation equipment Nontoxic paint High-efficiency fotures Prevent leaks Prechae potable sater Reduce city water Treat waste water on-site Implement IUS Collect numoff /aniwater Treat water onbott Maintanballast tanks	□ W22-Non-IndigenousSpecie □ W221-Balls Water Sedime □ W12-2-Hall Fouling □ W13-Sanitan Systems □ W45-Solid Wate □ W45-Solid Wate □ W45-Picted in of Oil □ GM 2-Hatel Water Use □ GM 1-Materials
W-2-BMPSs M-1: Reuse of Materials M-2- Recycle content	SSCA2-Stormwater Quality Control Wip1-Water Use Reduction Wip1-Water Use Reduction Wip2-Water Bifficient Landscaping Wip2-Move the Technologies Wip2-Mater Use Reduction Mip3-Water Use Reduction Mip1-Recyclables Mip1-Recyclables	□ Wc3.2-Pedace barderage tripation □ Wc3.3-Protect /Redore buffers □ Wc3.5-Parameter or Section 1 Wc3.5-Wanage stormster on Section 1 Wc3.5-Wanage stormster or Section 2 Wc3.7-We stormster for landscape □ Wc3.8-Waharian sater features □ Ohlph.1-Sustainable maintenance □ MSpS.1-Birninate threatened wood □ MSpS.1-Birninate threatened wood □ MSSS.2-Maintain often	S-2: Use TurfgrassAppropriately W-2: Implement Stormmater BMPs N-2: Implement Rainwater Nestrality N-3: Reduce Use of Potable Water N-4: Utilize Brd Use Metering IO-3:Sustainable Landscape Maintenance IO-2: Maintain Soil Quality	Oil separation equipment Nontoxic paint High-efficiency futures Prevent leaks Prevent leaks Reduce potable sater Reduce city sater Treat state sater on-site Intellment IUIs Collect numoff frainsater Treat state comboat Maintamballast tanks Exchange soff-shore Reduce state due to activity Recycling dampsters	□ WZ-Non-IndigenousSpecie WZ-1-Balls Water /Sedine WZ-2-Hall Fouling WZ-3-Hall Fouling WZ-3-Sharl Systems U WZ-5-Sharl Systems U WZ-5-Sharl Systems U WZ-5-Sharl Sharl
W-2:BM PSs M-1: Reuse of Materials M-2: Recycle content M-1: The Materials M-2: The Materials M-3: The Materials M-3: The Materials M-3: The Materials	SSCA2-Stormwater Quality Costrol Wfp1-Marte UR-Reduction Wfp1-Marte UR-Reduction Wfp2-Hmovat Ne Technologies Wfp2-Hmovat Ne Technologies Wfp2-Marter Use Reduction M Rp1-Recyclables M Rp1-Becyclables M Rp1-Becyclables M Rp1-Wfp1-Wfp1-Wfp1-Wfp1-Wfp1-Wfp1-Wfp1-Wf	□ Vc1.2-Reduce bandrage brigation □ Vc2.3-theck (Reduce buffer) □ Vc2.4-Rehabilitate streams □ Vc2.5-Manage stormaster on ske □ Vc3.5-Manage stormaster on ske □ Vc3.7-Use stormaster for landsage □ Vc3.7-Use stormaster for landsage □ Vc3.8-Maintain uster features □ OMp8.1-Sistainable maintenance	□ S-2: Use TurfgrassAppropriately □ Nr-2: Implement Sommsater BM Ps □ Nr-2: Reduce Use of Petable Water □ Nr-4: Unite Brit Use Metering □ 10-1-Statishishic Landscape Maintenance □ 10-2: Maintain Soil Quality □ S-18: Amendand Reuse Existing Soils □ S-18: Balance Earthwork □ Nr-2: Use Recycled Materials	Oil separat inn equipment Nentroxic pair I figh-efficiency fixtures Prevent leaks Reduce potable water Reduce city water Reduce potable Reduce city water Treat waste water or-sike I roplement UDS Collect numoff fainwater Treat water or hoot Maintainballast tranks Ecclusing soff-shore Reduce waste due to activity Recycling dampsters Sort waste for recycling	□ W22-Non-IndigenousSpecie □ W22.1-Stalls Water /Sedime □ W12.2-Hall Fouling □ W13-Sanitan / Systems □ W45-Solid Wate □ W45-Picklethal Disharage □ W45-Picklethal Disharage □ W56-Picklethal Of M1 □ GM 2-Hatel Water Use
W-2: Reuse of Materials M-2: Reuse of Materials M-3: Rocally frovided Material M-3: Locally frovided Material M-4: Borengineering Techniques	SSCA2-Stormwater Quality Control Wip1-Water Use Reduction Wip1-Water Use Reduction Wip2-Water Wip2-Water Wip3-Water Wip3-Water Wip3-Water Wip3-Water Use Reduction MR3-Water Use Reduction MR01-Recyclables MRC11-Building Reuse-Steerkor MRC12-Building Reuse-Steerkor MRC2-Water Management	□ Wc3.2-Reduce bardscape trigation □ Wc3.3-Reduce bardscape □ Wc3.5-Manage stormsteron ste □ Wc3.5-Manage stormsteron ste □ Wc3.5-Manage stormsteron ste □ Wc3.5-Manage stormsteron ste □ Wc3.7-Use stormsteron for landscape □ Wc3.8-Manistan ster features □ Wc3.8-Manistan ster features □ Wc3.8-Manistan steronce □ MSpS.1-Eliminate threatened wood □ MSpS.2-Maintain often □ MSS.3-Design for deconstruction □ MSS.3-Design for deconstruction	□ 5-2: Use Turfgras: Appropriately □ Nr-2: Implement Stommater BM Ps □ Nr-2: Reduce Use of Pstable Water □ Nr-4: Ulilie Brit Use Metering □ 10-1-Sustainable Landscape Maintenance □ 10-2: Maintain Soil Quality □ S-18: Amendand Beuse Existing Soils □ S-18: Balance Earthwork □ Nr-2: Use Becycled Materials □ Nr-2: Use Becycled Materials	Oil separation equipment Nentoxic paint Heigh-efficiency fixtures Prevent leaks Prevent leaks Reduce portable stater Reduce city stater Treat state state orn-site Implement UDs Collect numoff faintwater Treat state orn-boat Maintainballast tanks Exchange soff-shore Reduce state the totact Nity Recycling dampsters Soft state for recycling Recycling Recycling	□ W22-Non-IndigenousSpecie □ W22.1-Stalls Water /Sedime □ W12.2-Hall Fouling □ W13-Sanitan / Systems □ W45-Solid Wate □ W45-Picklethal Disharage □ W45-Picklethal Disharage □ W56-Picklethal Of M1 □ GM 2-Hatel Water Use
W-2: Reuse of Materials M-2: Reuse of Materials M-3: Rocally frovided Material M-3: Locally frovided Material M-4: Borengineering Techniques	SSCA2-Stormwater Quality Costrol Wfis1-Water UR-Reduction Wfis2-Water Efficient Landscaping Wfis2-Water Use Reduction MFis2-Water Use Reduction MRp1-Recyclables MRp1-1-Building Reuse-Daterior MRp1-Water Use Reduction	□ VG.23-Reduce hardcage brigation □ VG.33-Marce (Reduce buffers) □ VG.34-Rehabilitate streams □ VG.35-Marage stormaster on site □ VG.35-Marage stormaster on site □ VG.35-Marian studer restricts □ VG.37-Marian studer restricts □ VG.38-Marian students □ VG.38-Mar	S-2: Use TurfgrassAppropriately Nr-3: bringenert Sormaster EMP 5 Nr-2: hriptement Rainsaster Neutrality Nr-3: Reduce Use of Protable Water Nr-4: Utilize for Use Metering IO-3:Sustainable Landscape Maintenance IO-2: Maintain Soil Quality S-10: Amend and Reuse Existing Soils S-11: Balance Earthough Nr-2: Use Beachte Model IM-2: Use Local/Regional Materials IM-3: Reuse Materials IM-3: Reuse Materials IM-3: Reuse Materials	Oliseparation equipment Nontrock pair I full-efficiency fictures I full-efficiency fiction fictio	□ W22-Non-IndigenousSpecie □ W22.1-Stalls Water /Sedims □ W12.2-Hall Fouling □ W13-Sanitan / Systems □ W43-Solid Wate □ W45-Indiction of Oil □ GM 2-Hitel Water Use □ GM 1-Materials
W-2: Reuse of Materials M-2: Reuse of Materials M-3: Rocally frovided Material M-3: Locally frovided Material M-4: Borengineering Techniques	SSCA2-Seamwater Quality Costrol Wip1-Water Use Reduction Wip1-Water Use Reduction Wip2-Water Use Reduction Wip2-Water Wip2-Water Use Reduction Wip3-Water Use Reduction MR01-Recyclables MR01-Recyclables MR01-Bailting Reus-Paterior MR02-Water Management MR03-Water Management MR03-Water Management MR03-Water Management MR03-Water Management MR03-Water Management MR03-Water Management MR04-Recycled Content	□ WG32-Reduce bardscape trigation □ WG33-Reduce bardscape □ WG34-Reduce buffers □ WG35-Wanape stormwater on ske □ WG35-Wanape stormwater on ske □ WG35-Wanape stormwater of sandscape □ WG37-Was stormwater for landscape □ WG38-Wanahan water features □ OMpR 1-Sustainable maintenance □ MSpS1-Eliminate threatened wood □ MSS2-Waintainablen □ MSS3-Waintainablen □ MSS3-Waintainablen □ MSS3-Waintainablen □ MSS3-Weinpfor deconstruction □ MSS3-Recyted content materials □ MSS3-Recyted content materials □ MSS3-Recyted content materials	□ 5-2: Use TurfgrassApproprietely □ Nr-2: Implement Stormmater BM Ps □ Nr-2: Reduce Use of Prable Water □ Nr-4: Utilize Brut Use Metering □ 10-3: Statishable Landscape Maintenance □ 10-2: Maintain Soil Quality □ S-18: Amendand Reuse Existing Soils □ S-18: Balance Earthwork □ Mr-2: Use Recycled Materials □ Mr-2: Use Local/Regional Materials □ Mr-2: Use Local/Regional Materials □ Mr-2: Reuse Materials □ Mr-2: Use Local/Regional Materials □ Mr-2: Use Local/Regional Materials	Oll separation equipment Nontoxic paint Hefs-efficiency fixtures Prevent leaks Reduce potable sater Reduce city sater Treat sater con-Sec Implement LIDs Collect nunoff frainsater Treat sater on-boat Maintaniballast tarks Exchange soft-shore Reduce saste due to activity Recycling dumpares Sort sated for recycling Recycle bins High-recyclable materials Hardous saxee plan	□ W22-Non-IndigenousSpecie □ W22.1-Stalls Water /Sedime □ W12.2-Hall Fouling □ W13-Sanitan / Systems □ W45-Solid Wate □ W45-Picklethal Disharage □ W45-Picklethal Disharage □ W56-Picklethal Of M1 □ GM 2-Hatel Water Use
W-2: Reuse of Materials M-2: Reuse of Materials M-3: Rocally frovided Material M-3: Locally frovided Material M-4: Borengineering Techniques	SSCA-Stormwater Quality Costrol Wip1-Marte UR-Reduction Wip1-Marte UR-Reduction Wip2-Amovathe Technologies Wip2-Amovathe Technologies Wip3-Water Use Reduction MR01-Recyclables MR01-Recyclables MR01-Pauliding Reuse-Exterior	□ VC3.2-Reduce hardcage brigation □ VC3.3-These (Reduce buffers) □ VC3.3-Hardse stormaster on ske □ VC3.5-Hardse stormaster on ske □ VC3.5-Hardse stormaster on ske □ VC3.7-Use stormaster for landsage □ VC3.8-Hardsin stater features □ VC3.8-Hardsin state (No.8-Hardsin state) □ VC3.8-Hardsin state (No.8-Ha	S-12: Use TurfgrassAppropriately Nr-2: hymperner Sormaster BMP: Nr-2: hymperner Sormaster BMP: Nr-2: hymperner Rainwater Neutrality Nr-4: Unite of the Meeting IO-15: Usefalle Water IO-2: Maintain Soil Quality S-10: Balance Sorthwork Nr-2: Use Hospital Materials IN -2: Use Hocycled Materials IN -2: Use Hocycled Materials IN -3: Euse Materials IN -4: Use Drashie Materials IN -8: Use Drashie Materials IN -8: Use Drashie Materials IN -8: Such analyby Harvet ed Wood	Oil separation equipment Nontrock pair High-efficiency fictures Reduce potable sater Reduce potable sater Reduce city sater Reduce potable sater Reduce city sater Reduce sater consider Reduce sater che to act Nity Recycling dumpters Sort sater for recycling Recycle bins Hardous sater plan Hardous sater plan Sustainable materials	□ W22-Non-IndigenousSpecie □ W22.1-Stalls Water /Sedime □ W12.2-Hall Fouling □ W13-Sanitan / Systems □ W45-Solid Wate □ W45-Picklethal Disharage □ W45-Picklethal Disharage □ W56-Picklethal Of M1 □ GM 2-Hatel Water Use
W-2: Reuse of Materials M-2: Reuse of Materials M-3: Rocally frovided Material M-3: Locally frovided Material M-4: Borengineering Techniques	SSCA2-Seamwater Quality Costrol Wip1-Water Use Reduction Wip1-Water Use Reduction Wip2-Water Use Reduction Wip2-Water Use Reduction Wip2-Water Use Reduction MR91-Recyclables MR91-Recyclables MR91-Bailting Reuse-Paterior MR92-Water Management MR93-Materials Reuse MR94-Recycled Content	□ WG32-Reduce bardscape trigation □ WG33-Reduce bardscape □ WG34-Reduce buffers □ WG34-St-Wanape stormwater on Ste □ WG35-St-Wanape stormwater on Ste □ WG35-Value stormwater for landscape □ WG37-Value stormwater for landscape □ WG38-Wastran water features □ OMp8.1-Statishible maintenance □ MSpS.1-Biminate threatened wood □ MSpS.2-Wastrain-often □ MSpS.3-Biminate of threatened wood □ MSpS.3-Reduced content materials □ MSpS.3-Reduced voluminaterials □ MSpS.3-Reduced voluminaterials	□ S-2: Use Turf'grass/Approprietely □ Nr-2: Implement Stormmater BM Ps □ Nr-2: Reduce Use of Potable Water □ Nr-4: Utilize Brit Use Metering □ 10-1-Statishible Landscape Maintenance □ 10-2: Maintain Soil Quality □ S-18: Amendand Reuse Exiting Soils □ S-18: Balance Earthwork □ Nr-2: Use Local/Regional Materials □ Nr-2: Use Local/Regional Materials □ Nr-4: Sustainably Harvested Wood ■ Nr-6: Minimize Took: Materials	Oll separation equipment Nontoxic paint Hefs-efficiency fixtures Prevent leaks Reduce potable sater Reduce city sater Treat sater con-Sec Implement LIDs Collect nunoff frainsater Treat sater on-boat Maintaniballast tarks Exchange soft-shore Reduce saste due to activity Recycling dumpares Sort sated for recycling Recycle bins High-recyclable materials Hardous saxee plan	□ W22-Non-IndigenousSpecie □ W22.1-Stalls Water /Sedime □ W12.2-Hall Fouling □ W13-Sanitan / Systems □ W45-Solid Wate □ W45-Picklethal Disharage □ W45-Picklethal Disharage □ W56-Picklethal Of M1 □ GM 2-Hatel Water Use
W-2: Reuse of Materials M-2: Reuse of Materials M-3: Rocally frovided Material M-3: Locally frovided Material M-4: Borengineering Techniques	SSCA-Stormwater Quality Costrol Wight-Water Un Reduction Wight-Water Un Reduction Wight-Water Use Reduction Wight-Water Use Reduction MRG1-Recyclables MRG1-Recyclables MRG1-Bailding Reuse-Sterior MRG1-Bailding Reuse-Sterior MRG2-Water Use Paragraphy MRG2-Water Management MRG2-Water Water Wat	□ VC3.2-Reduce hardcape brigation □ VC3.3-Protec (Reduce buffers) □ VC3.4-Rehabilitate streams □ VC3.5-Harage stormsister on site □ VC3.5-Harage stormsister for landscape □ VC3.7-Use stormsister materials □ MSC3.7-Use stormsister landscape	S-2: Use Turfgras-Appropriately Nr-2: hymberner Sormanter BMP: Nr-2: hymberner Rainwater Neutrality Nr-2: hymberner Rainwater Neutrality Nr-4: Utilize End Use Metering IO-2-Sustainable Landscape Naintenance IO-2: Maintain Soil Quality S-10: Raintain Soil Quality S-10: Balance Enthwork Mr-2: Use Recycled Materials IM -2: Use Local/Regional Materials IM -3: Ruse Materials IM -3: Ruse Materials IM -3: Euse Materials IM -5: Sustainably hinve sed Wood IM -6: Minimize Took Materials IM -5: We Charable Materials IM -6: Minimize Took Materials	Olis esparation equipment Nontrock pair High-efficiency fictures Reduce potable sater Reduce potable sater Reduce city sater Reduce sater on-bact Reduce sater che to act Nity Recycling dumpters Sort sater for recycling Recycle bins Hardous sater plan Hardous sater plan Sustainable materials	□ W22-Non-IndigenousSpecie □ W22.1-Stalls Water /Sedime □ W12.2-Hall Fouling □ W13-Sanitan / Systems □ W45-Solid Wate □ W45-Picklethal Disharage □ W45-Picklethal Disharage □ W56-Picklethal Of M1 □ GM 2-Hatel Water Use
W-2: Reuse of Materials M-2: Reuse of Materials M-3: Rocally frovided Material M-3: Locally frovided Material M-4: Borengineering Techniques	SSCA2-Seamwater Quality Costrol Wip1-Water Use Reduction Wip1-Water Use Reduction Wip2-Water Use Reduction Wip2-Water Use Reduction Wip2-Water Use Reduction MR91-Recyclables MR91-Recyclables MR91-Bailting Reuse-Paterior MR92-Water Management MR93-Materials Reuse MR94-Recycled Content	□ WG32-Reduce bardscape trigation □ WG33-Reduce bardscape □ WG34-Reduce buffers □ WG34-St-Wanape stormwater on Ste □ WG35-St-Wanape stormwater on Ste □ WG35-Value stormwater for landscape □ WG37-Value stormwater for landscape □ WG38-Wastran water features □ OMp8.1-Statishible maintenance □ MSpS.1-Biminate threatened wood □ MSpS.2-Wastrain-often □ MSpS.3-Biminate of threatened wood □ MSpS.3-Reduced content materials □ MSpS.3-Reduced voluminaterials □ MSpS.3-Reduced voluminaterials	□ S-2: Use Turf'grass'Appropriately □ N'-2: Implement Sommsater BM Ps □ N'-2: Reduce Use of Petable Water □ N'-3: Reduce Use of Petable Water N'-4: Uille Bird Use Metering □ 10-1-Statishishle Landscape Maintenance □ 10-2: Maintain Soil Quality □ S-18: Balance Earthwork □ N'-5: Use Local/Regional Materials □ M'-2: Use Local/Regional Materials □ M'-6: Whimite Took Materials □ M'-6: Whimite Took Materials □ M'-6: Whimite Took Materials □ M'-6: Minimize Took Materials	Olis esparation equipment Nontrock pair High-efficiency fictures Reduce potable sater Reduce potable sater Reduce city sater Reduce sater on-bact Reduce sater che to act Nity Recycling dumpters Sort sater for recycling Recycle bins Hardous sater plan Hardous sater plan Sustainable materials	□ W22-Non-IndigenousSpecie □ W22.1-Stalls Water /Sedime □ W12.2-Hall Fouling □ W13-Sanitan / Systems □ W45-Solid Wate □ W45-Picklethal Disharage □ W45-Picklethal Disharage □ W56-Picklethal Of M1 □ GM 2-Hatel Water Use
W-2: Reuse of Materials M-2: Reuse of Materials M-3: Rocally frovided Material M-3: Locally frovided Material M-4: Borengineering Techniques	SSCA-Stormwater Quality Costrol Wight-Water Un Reduction Wight-Water Un Reduction Wight-Water Use Reduction Wight-Water Use Reduction MRG1-Recyclables MRG1-Recyclables MRG1-Bailding Reuse-Sterior MRG1-Bailding Reuse-Sterior MRG2-Water Use Paragraphy MRG2-Water Management MRG2-Water Water Wat	□ VC3.2-Reduce hardcape brigation □ VC3.3-Protec (Red or buffer) □ VC3.4-Rehabilitate streams □ VC3.5-Harage stormater on site □ VC3.5-Harage stormater or face □ VC3.7-Use stormater for landscape □ WS5.3-Use s	S-2: Use Turfgras-Appropriately Nr-2: hymberner Sormanter BMP: Nr-2: hymberner Rainwater Neutrality Nr-2: hymberner Rainwater Neutrality Nr-4: Utilize End Use Metering IO-2-Sustainable Landscape Naintenance IO-2: Maintain Soil Quality S-10: Raintain Soil Quality S-10: Balance Enthwork Mr-2: Use Recycled Materials IM -2: Use Local/Regional Materials IM -3: Ruse Materials IM -3: Ruse Materials IM -3: Euse Materials IM -5: Sustainably hinve sed Wood IM -6: Minimize Took Materials IM -5: We Charable Materials IM -6: Minimize Took Materials	Olis esparation equipment Nontrock pair High-efficiency fictures Reduce potable sater Reduce potable sater Reduce city sater Reduce sater on-bact Reduce sater che to act Nity Recycling dumpters Sort sater for recycling Recycle bins Hardous sater plan Hardous sater plan Sustainable materials	□ W22-Non-IndigenousSpecie □ W22.1-Stalls Water /Sedime □ W12.2-Hall Fouling □ W13-Sanitan / Systems □ W45-Solid Wate □ W45-Picklethal Disharage □ W45-Picklethal Disharage □ W56-Picklethal Of M1 □ GM 2-Hatel Water Use
W-2: Reuse of Materials M-2: Reuse of Materials M-3: Rocally frovided Material M-3: Locally frovided Material M-4: Borengineering Techniques	SSCA-Stormwater Quality Costrol Wight-Water Un Reduction Wight-Water Un Reduction Wight-Water Use Reduction Wight-Water Use Reduction MRG1-Recyclables MRG1-Recyclables MRG1-Bailding Reuse-Sterior MRG1-Bailding Reuse-Sterior MRG2-Water Use Paragraphy MRG2-Water Management MRG2-Water Water Wat	□ WG32-Reduce bardscape trigation □ WG33-Pridect /Reduce buffers □ WG34-Rehabilitate streams □ WG35-Warape stormwater on Se □ WG35-Warape stormwater on Se □ WG37-Was stormwater for landscape □ WG37-Was than water features □ WG38-Wastrah water features □ WG38-Wastrah water features □ MSp51-Biminate threatened wood □ MS52-Wastrah water features □ MSp53-Design for deconstruction □ MS53-Wastrah for deconstruction □ MS53-Puter spinoal materials □ MS53-Pute regional materials □ MS53-Puter spinoal materials	□ S-2: Use Turf'grass'Appropriately □ N'-2: Implement Sommsater BM Ps □ N'-2: Reduce Use of Petable Water □ N'-3: Reduce Use of Petable Water N'-4: Uille Bird Use Metering □ 10-1-Statishishle Landscape Maintenance □ 10-2: Maintain Soil Quality □ S-18: Balance Earthwork □ N'-5: Use Local/Regional Materials □ M'-2: Use Local/Regional Materials □ M'-6: Whimite Took Materials □ M'-6: Whimite Took Materials □ M'-6: Whimite Took Materials □ M'-6: Minimize Took Materials	Olis esparation equipment Nontrock pair High-efficiency fictures Reduce potable sater Reduce potable sater Reduce city sater Reduce sater on-bact Reduce sater che to act Nity Recycling dumpters Sort sater for recycling Recycle bins Hardous sater plan Hardous sater plan Sustainable materials	□ W22-Non-IndigenousSpecie □ W22.1-Stalls Water /Sedime □ W12.2-Hall Fouling □ W13-Sanitan / Systems □ W45-Solid Wate □ W45-Picted Water □ W55-Picted water □ W56-Picted water Use □ GM 2-Hatel Water Use
W-2: Reuse of Materials M-2: Reuse of Materials M-3: Rocally frovided Material M-3: Locally frovided Material M-4: Borengineering Techniques	SSCA-Stormwater Quality Costrol Wight-Water Un Reduction Wight-Water Un Reduction Wight-Water Use Reduction Wight-Water Use Reduction MRG1-Recyclables MRG1-Recyclables MRG1-Bailding Reuse-Sterior MRG1-Bailding Reuse-Sterior MRG2-Water Use Paragraphy MRG2-Water Management MRG2-Water Water Wat	□ VC3.2-Reduce hardcape brigation □ VC3.3-Protec (Red or buffer) □ VC3.4-Rehabilitate streams □ VC3.5-Harage stormater on site □ VC3.5-Harage stormater or face □ VC3.7-Use stormater for landscape □ WS5.3-Use s	□ S-2: Use Turf'grass'Appropriately □ N'-2: Implement Sommsater BM Ps □ N'-2: Reduce Use of Petable Water □ N'-3: Reduce Use of Petable Water N'-4: Uille Bird Use Metering □ 10-1-Statishishle Landscape Maintenance □ 10-2: Maintain Soil Quality □ S-18: Balance Earthwork □ N'-5: Use Local/Regional Materials □ M'-2: Use Local/Regional Materials □ M'-6: Whimite Took Materials □ M'-6: Whimite Took Materials □ M'-6: Whimite Took Materials □ M'-6: Minimize Took Materials	Olis esparation equipment Nontrock pair High-efficiency fictures Reduce potable sater Reduce potable sater Reduce city sater Reduce sater on-bact Reduce sater che to act Nity Recycling dumpters Sort sater for recycling Recycle bins Hardous sater plan Hardous sater plan Sustainable materials	□ W22-Non-IndigenousSpecie □ W22.1-Stalls Water /Sedime □ W12.2-Hall Fouling □ W13-Sanitan / Systems □ W45-Solid Wate □ W45-Picted Water □ W55-Picted water □ W56-Picted water Use □ GM 2-Hatel Water Use
W-2: Reuse of Materials M-2: Reuse of Materials M-3: Rocally frovided Material M-3: Locally frovided Material M-4: Borengineering Techniques	□ SSCA-3-Stormwater Quality Costrol □ Wig1-4-Water Use Reduction □ Wig1-4-Water Efficient Landscaping □ Wig2-4-browather Technologies □ Wig3-4-Water Use Reduction □ Wig3-4-Water Use Reduction □ Wig3-4-Water Use Reduction □ Wig3-4-Water Use Reduction □ M RC1-1-Bailding Reuse—Sterrior □ M RC1-1-Bailding Reuse—Sterrior □ M RC2-4-Water Water Water Use M RC2-4-Water Water Water Use M RC2-4-Water Water Water Use M RC3-4-Water Water W	□ VC3.2-Reduce hardcape brigation □ VC3.3-Protec (Reduce buffers) □ VC3.4-Rehabilitate streams □ VC3.5-Gharing a tomister on ske □ VC3.5-Gharing a tomister on ske □ VC3.5-Gharing a tomister of hardcape □ VC3.7-Use tormister for landcape □ VC3.7-Use tormister of landcape □ VC3.7-Use tormister market name □ MSC3.7-Use tormister threatened wood □ MSC3.7-Use hardcape for the construction □ MSC3.7-Use hardcape for landcape □ MSC3.5-Use certified wood □ MSC3.7-Use regional materials □ MSC3.5-Use regional materials □ MSC3.5-Use thread be plant production □ MSC3.1-Sustainable manufacturing □ MyRC3.5-Use regional materials □ MyRC3.5-Use thread by plant production □ MSC3.1-Sustainable manufacturing □ MyRC3.5-Use regional materials	□ S-2: Use Turf'grass'Appropriately □ N'-2: Implement Sommsater BM Ps □ N'-2: Reduce Use of Petable Water □ N'-3: Reduce Use of Petable Water N'-4: Uille Bird Use Metering □ 10-1-Statishishle Landscape Maintenance □ 10-2: Maintain Soil Quality □ S-18: Balance Earthwork □ N'-5: Use Local/Regional Materials □ M'-2: Use Local/Regional Materials □ M'-6: Whimite Took Materials □ M'-6: Whimite Took Materials □ M'-6: Whimite Took Materials □ M'-6: Minimize Took Materials	Oil separation equipment Nontroxic pair High-efficiency fictures Headre event leaks Reduce potable mater Reduce city mater Reduce city mater Treat maste water on-sike Implement UIDs Collect runoff fainmater Treat water comboat Maintainballast tranks Exchanges off-shore Reduce mate due to activity Recycle pinningers Sort mater for recycling Recycle pinningers High-recyclable materials Haardous materials Low-emittingmaterials	□ W22-Non-IndigenousSpecie W221-Balls Water (#edina U W22-2+Hall Fooling U W23-Sankar (Ysperms □ W164-Solid Wate □ W153-Incidental Dicharage □ W164-Solid Wate □ W164-Solid Wate □ W164-Incidental Dicharage □ W164-Incidental Dicharage □ W164-Incidental Dicharage □ GM2-Incidental Dicharage □ GM2-Incidental Dicharage □ GM4-Incidental Dicharage □ GM4-Incidental Dicharage □ GM5-Ship Recycling
W-2: Reuse of Materials M-2: Reuse of Materials M-3: Rocally frovided Material M-3: Locally frovided Material M-4: Borengineering Techniques	SSCA2-Stormwater Quality Costrol Wfis1-Marte WReduction Wfis2-Water Use Reduction Wfis2-Water Use Reduction Wfis2-Water Use Reduction M Rp1-Recyclables M Rp1-1-Building Reuse-Exterior M Rp2-1-Building Reuse-Exterior M Rp2-Water Use Reduction M Rp3-Water Use Research M Rp3-Reduction Water Use Reduction M Rp3-Reduction Reduction M Rp3-Reduction M Rp3-Reducti	□ VC12-Reduce bandrage brigation □ VC23-Protect (Reduce buffers) □ VC23-Harage stormaster on significant of the VC24-Rehabilitate streams □ VC23-Harage stormaster on significant of VC23-Harage stormaster of landsage □ VC33-Harage stormaster for landsage □ VC33-Harage stormaster st	□ S-2: Use Turf'grass'Appropriately □ N'-2: Implement Sommsater BM Ps □ N'-2: Reduce Use of Petable Water □ N'-3: Reduce Use of Petable Water N'-4: Uille Bird Use Metering □ 10-1-Statishishle Landscape Maintenance □ 10-2: Maintain Soil Quality □ S-18: Balance Earthwork □ N'-5: Use Local/Regional Materials □ M'-2: Use Local/Regional Materials □ M'-6: Whimite Took Materials □ M'-6: Whimite Took Materials □ M'-6: Whimite Took Materials □ M'-6: Minimize Took Materials	Oli separat inn equipment Nentroxic pair I figh-efficiency fictures Prevent Raks Reduce potable sater Reduce potable sater Reduce city sater Treat sasts swater on-sike I ropiement UDs Collect runoff frainsater Treat sasts swater on-boat Maritan ballast starks Exchanges off-shore Recycling dampsters Sort saste for recycling Recycling dampsters Sort saste for recycling Recyclable materials Heardous saste plan Sustainable materials Low-emitting materials Low-emitting materials Out side air intake Natural vert list ion Mainriak chemical use	□ W21-Non-Indigenous Specie W P21-Balls Water (Redins W P21-Shalls Water (Redins U W22-Shalls Vaser W F3-Shalls Vaser W F3-Shalls Vaser W F3-India Water W F3-India Wa
W-2: Reuse of Materials M-2: Reuse of Materials M-3: Rocally frovided Material M-3: Locally frovided Material M-4: Borengineering Techniques	SSCA-Stormwater Quality Costrol Wight-Water Une Reduction Wist-Twiter Efficient Landscaping Wist-Twinouther Technologies Wist-Twinouther Technologies Wist-Twinouther Reduction MRG1-Recyclables MRG1-Recyclables MRG1-L-Building Reuse—Sterior MRG1-L-Building Reuse—Sterior MRG1-Swinouther Management MRG2-Water Management MRG3-Waterials Reuse MRG4-Recyclable Materials MRG4-Recyclable Materials MRG4-Recyclable Control MRG5-Recyclable Materials MRG4-Recyclable Materials MRG4-Recyclable Description RGG1-Databox Air Monitoring ERQ1-Databox Air Monitoring ERQ2-Databox Air Monitoring ERQ2-Databox Air Monitoring	□ WC3.2-Reduce hardcape brigation □ WC3.3-Protect (Red ore buffer) □ WC3.4-Fleshbilitate streams □ WC3.5-Gharage stormwater on de □ WC3.5-Gharage stormwater on de □ WC3.5-Gharage stormwater for landscape □ WC3.5-Just an inster features □ WC4.5-Just an inster features □ WC4.5-Just an inster features □ WC4.6-M initial inster to bacco make	□ S-2: Use Turf'grass'Appropriately □ N'-2: Implement Sommsater BM Ps □ N'-2: Reduce Use of Petable Water □ N'-3: Reduce Use of Petable Water N'-4: Uille Bird Use Metering □ 10-1-Statishishle Landscape Maintenance □ 10-2: Maintain Soil Quality □ S-18: Balance Earthwork □ N'-5: Use Local/Regional Materials □ M'-2: Use Local/Regional Materials □ M'-6: Whimite Took Materials □ M'-6: Whimite Took Materials □ M'-6: Whimite Took Materials □ M'-6: Minimize Took Materials	Oli separat innequipment Nentoxic pair High-efficiency fictures Prevent leaks Reduce potable mater Reduce city mater Reduce city mater Treat mate mater on-site Insplement IUIs Collect numf frainmater Treat sate on-boat Maritan ballast tranks Exchanges off-shore Recycling decorated and treatment iuis Recycling have been concluded and treatment iuis Statistical and treatment iuis United and treatment iuis U	□ W22-Non-IndigenousSpecie W22.1-Balls Water (Redine W22.2-Hall Fouling W25-Sharlar Vystems □ W25-Sharlar Vystems □ W25-Sharlar Vystems □ W25-Sharlar Vystems □ GM2-Harlar Use □ GM2-Harlar Use □ GM4-Harlar Use □ GM5-Ship Recycling □ GM5-Ship Recycling □ GM5-Ship Recycling □ AE1-NOx Reductions □ AI2-Sox Reductions □ AI2-M Reductions □ AI2-M Reductions
W-2: Reuse of Materials M-2: Reuse of Materials M-3: Rocally frovided Material M-3: Locally frovided Material M-4: Borengineering Techniques	SSCA2-Stormwater Quality Costrol Wfis1-Marte WReduction Wfis2-Water Use Reduction Wfis2-Water Use Reduction Wfis2-Water Use Reduction M Rp1-Recyclables M Rp1-1-Building Reuse-Exterior M Rp2-1-Building Reuse-Exterior M Rp2-Water Use Reduction M Rp3-Water Use Research M Rp3-Reduction Water Use Reduction M Rp3-Reduction Reduction M Rp3-Reduction M Rp3-Reducti	□ WC3.2-Reduce hardcape brigation □ WC3.3-Protect (Red ore buffer) □ WC3.4-Fleshbilitate streams □ WC3.5-Gharage stormwater on de □ WC3.5-Gharage stormwater on de □ WC3.5-Gharage stormwater for landscape □ WC3.5-Just an inster features □ WC4.5-Just an inster features □ WC4.5-Just an inster features □ WC4.6-M initial inster to bacco make	□ S-2: Use Turf'grass'Appropriately □ N'-2: Implement Sommsater BM Ps □ N'-2: Reduce Use of Petable Water □ N'-3: Reduce Use of Petable Water N'-4: Uille Bird Use Metering □ 10-1-Statishishle Landscape Maintenance □ 10-2: Maintain Soil Quality □ S-18: Balance Earthwork □ N'-5: Use Local/Regional Materials □ M'-2: Use Local/Regional Materials □ M'-6: Whimite Took Materials □ M'-6: Whimite Took Materials □ M'-6: Whimite Took Materials □ M'-6: Minimize Took Materials	Oil separation equipment Nontrock pair High-efficiency fictures Prevent Raks Reduce potable sater Reduce potable sater Reduce city sater Reduce potable Reduce city sater Reduce potable Reduce potable Inplement UID Collect runoff fainsater Treat sater ornboat Maintanhabilast tranks Exchange soff-shore Reduce saste due to each Nity Recycling dampsters Sort saste for recycling Recycle bins Heardous saste plan Sustainable materials Low-emitting materials Low-emitting materials Low-emitting materials Out side air intake Natural-vert list ton Minimize chemical use Reduce flying ditt Lunk engines running	□ W22-Non-IndigenousSpecie W22.1-Shisk Water (Sedim U W22.3-Shisk Water (Sedim U W23-Shisk Water (Sedim U W23-Shisk Water U W3-Shickers of Distriction of Oil GM 2-Hatel Water Use □ GM 2-Hatel Water Use □ GM 4-Haterials □ GM 4-Haterials □ GM 5-Shis Recycling □ AEI-NOx Reductions □ AEI-Sox Reductions □ AEI-POCC □ AEI-Sox Reductions □ AEI-VOCC □ AEI-SHISS
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□ W-2-BM PSs □ M-2-Reuse of Materials □ M-2-Recycle content □ M-3-Locally Provided Material □ M-4-Bioengineering Techniques □ M-5-Pa haardous Minimization	□ SSCA-Stormwater Quality Costrol □ Wip1-Water UR-Reduction □ Wip2-Water UR-Reduction □ Wip3-Water Use Reduction □ Mip3-Water Us	□ VC12-Reduce hardcape brigation □ VC33-Protec (Rect or buffer) □ VC34-Rehabilitate streams □ VC34-Palanage stormaster on site □ VC34-Palanage stormaster on site □ VC34-Palanage stormaster or facilitate □ VC34-Palanage stormaster or landscape □ VC34-Palanage □ MS53-Palanage □ MS53-Pal		Oli separat inn equipment Nantoxic pair High-efficiency fictures Prevent Raks Reduce potable sater Reduce potable sater Reduce city sater Treat sate sate or-sike Implement UIDs Collect runoff fainsater Treat sate sate or-sike Tropic sate or sate or sate Treat sate sate or-sike Treat sate or-sixe Treat sate or-sixe Echanges off-shore Reduce sate due to act Nity Recycling dumpters Sort sate for recycling Recycle bins Hardous sate plan Sustainable materials Lou-emitting materials Lou-emitting materials Lou-emitting materials Out side air intake Reduce Tyling ditt Limit engines surning Avoid fossil fue lengines	□ WE2-Non-Indigenous Specie WE21-Balls Water / Sedim WE22-Shalls Water / Sedim U WE3-Sanitary Systems U WE3-Social Wate U WE3-India Water U
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□ W-2-BM PSs □ M-2-Reuse of Materials □ M-2-Recycle content □ M-3-Locally Provided Material □ M-4-Bioengineering Techniques □ M-5-Pa haardous Minimization	SSCA-Stormwater Quality Costrol Wight-Water Use Reduction Wight-Water Use Reduction Wight-Water Use Reduction Wight-Water Use Reduction Wight-Water Use Reduction Wight-Water Use Reduction Wight-Water Use Reduction Wight-Water Use Reduction Wight-Water Use Reduction Wight-Water Use Reduction Wight-Water Use Reduction Wight-Water Use Reduction Wight-Water Use Reduction Wight-Water Use Reduction Wight-Water Use Water Use Wat	□ WC3.2-Reduce hardcape brigation □ WC3.3-Hocker (Reduce buffers) □ WC3.4-Heabilitate streams □ WC3.5-Manage stormsatter on site □ WC3.5-Manage stormsatter on site □ WC3.5-Manage stormsatter of hardcape □ WC3.5-Manage stormsatter for landcape □ WC3.5-Manage stormsatter for landcape □ WC3.5-Manage stormsatter for landcape □ WC3.5-Manage stormsatter of landcape □ MSC3.1-Bustainable maintenance □ MSC3.1-Bustainable maintenance □ MSC3.1-Bustainable maintenance □ MSC3.1-Bustainable part production □ MSC3.1-Bustainable part production □ MSC3.1-Bustainable part production □ MSC3.1-Bustainable part production □ MSC3.1-Bustainable manufacturing □ MSC3.1-Bustainable part production □ MSC3.1-Bustainable part produc		Oli separat innecupiment Nantovic pair High-efficiency fictures Prevent Raks Reduce potable sater Reduce potable sater Reduce city sater Reduce city sater Treat sate sate or-sike Implement UIDs Collect runoff fainsater Treat sate sate or-sike Echanges off-shore Reduce sate che to activity Recycling darks Sort saste for recycling Recycle bins Haudous saste plan Haudous saste plan Sustainable materials Lou-emittingmaterials Lou-emittingmaterials Out-sike air intake Natural vert libit ion Minimize chemical use Reduce Tyling ditt Limit engines suming Avoid fossiff fue lengines Brownfield ske Cheanpolited water	□ W22-Non-IndigenousSpecie W22.1-Shisk Water (Sedim U W22.3-Shisk Water (Sedim U W23-Shisk Water (Sedim U W23-Shisk Water U W3-Shickers of Distriction of Oil GM 2-Hatel Water Use □ GM 2-Hatel Water Use □ GM 4-Haterials □ GM 4-Haterials □ GM 5-Shis Recycling □ AEI-NOx Reductions □ AEI-Sox Reductions □ AEI-POCC □ AEI-Sox Reductions □ AEI-VOCC □ AEI-SHISS
□ W-2-BM PSs □ M-2-Reuse of Materials □ M-2-Recycle content □ M-3-Locally Provided Material □ M-4-Bioengineering Techniques □ M-5-Pa haardous Minimization	SSC2-Stormwater Quality Cortrol Wight-Water Use Reduction MRC1-Building Reuse-Exterior MRC1-Building Reuse-Exterior MRC1-Building Reuse-Exterior MRC2-Water Management MRC2-Water Management MRC3-Water Management MRC3-Water Management MRC4-Recycled Content MRC5-Recipional Materials MRC4-Certified Wood IEQ24-Low-Emitting Naterials MRC5-Recipional Materials MRC5-Recipional Material	□ WC3.2-Reduce hardcape brigation □ WC3.3-Protect (Red ore buffer) □ WC3.4-Relabilitate streams □ WC3.4-Relabilitate streams □ WC3.5-Hardcape commatter on de □ WC3.5-On-ale susterressuces □ WC3.7-Use commatter for landscape □ WC3.8-Britan suster features □ WC3.8-Britan forten □ WC3.8-Britan britan from the wC3.8-Britan britan		Oil separation caupment Nentoxic pair High-efficiency fictures Prevent leads Reduce potable stater Reduce potable stater Reduce potable stater Reduce city stater Treat state usater on-site Interior state of the s	□ W22-Non-Indigenous Specie W22.1-Balls Water (Sedins □ W22.2-Hull Fosting □ W23-Sankary Systems □ W3-Sankary Systems □ W3-Sediction of Oil □ GM 2-Hatel Water Use □ GM 2-Hatel Water Use □ GM 3-Ship Recycling □ GM 5-Ship Recycling □ AE1-NOx Reductions □ AE2-Sox Reductions □ AE3-FM Reductions
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More integration on the detail level is part of ongoing research. This ongoing research envisions the development of a database where specific practices, actions and impacts can be data-mined in order to provide decision makers and designers with a more comprehensive view of the impacts of various decisions. In addition, integration is being analyzed to correlate the rating systems and sustainability guidelines with the WSF safety management system (SMS).

CONCLUSION

There is uncertainty in which regulations or green rating system guidelines WSF may be subject to in the future. The provided *green rating integration platform* (GRIP) will allow WSF to easily relate design and construction decisions across multiple green rating systems and within their sustainability guidelines as the situation or area of construction dictates. This will help facilitate green building, pollutant reduction, and other environmental goals of WSF. The GRIP format might similarly be applied to other projects which contain diverse components, and to more effectively and economically address sustainability across all aspects of projects and facility operations.

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ACKNOWLEDGEMENTS

The authors are grateful for funding provided for this project by the Washington State Ferries and also Washington State University. They are also appreciative of additional input from Susanne DesRoches of the Port Authority of NY/NJ and Dr. Eleanor Kirtley, LEED AP of The Glosten Associates.