

Florida Green Commercial Building Standard Reference Guide

Version 3 Rev 1.0

Effective June 1, 2019

Revised

4/30/2020

This reference guide is intended to serve two purposes:

- To provide information on green commercial practices.
- To provide details on how to earn points for complying with the Florida Green Commercial Designation Standard.

The Florida Green Building Coalition Green Commercial Standard applies to:

- All commercial buildings in Florida
- New construction and existing buildings
- Core and Shell Commercial Buildings

For each commercial application, the following are required submittals:

- Photos of the completed building – Front, back and sides.
- Dimensioned Floor Plans
- Landscape Plan and Plant list
- Irrigation Schematic

Depending on the credits selected, please be prepared to submit the following for documentation:

- Elevation
- Mechanical, Plumbing, and or Electrical plan/Lighting plan
- Foundation Plan
- Site Plan
- Survey

Some of the credits have required submittals, these are designated by the color red.

Core and Shell

When using this standard for a core and shell project, if accommodations are allowed for a given credit, the modified requirement is identified as “core and shell” and indicated within this reference guide.

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Note:

It is possible to combine many submittals in one detailed plan. Letters or documented verbal communication from vendors can substitute for material and equipment cut sheets where required. No document produced by FGBC is intended to supersede or contradict the Florida Building Code.

INSTRUCTIONS FOR SUBMISSIONS:

Electronic Submission (required)

[Pay online](#) or complete the credit card authorization on the Final Application Form. (Note: Payment by check is acceptable - see mailing instructions below).

Send the completed Excel file containing the Final Application and Checklist, along with all supporting documents to the FGBC FTP link below. Maximum file size for FTP is 2 GB. Consider zipping groups of files before sending.

FGBC FTP Link: <https://dropbox.hightail.com/certifications>

Payment Mailing Instructions

Mail check or credit card authorization (see Final Application Form) to FGBC at the address below. Include a printed copy of the Final Application Form. Submit complete checklist and documentation via Hightail as shown above.

FGBC

P.O. Box 2406

Orlando, FL 32802

For Additional Information contact your Project Evaluator or FGBC at PH: 407-777-4914. All documents are available for download on the FGBC website: www.FloridaGreenBuilding.org

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CATEGORY 1: PROJECT MANAGEMENT

PM Prerequisite 1: Green Project Meeting

Requirement: Owner and project team decision makers must participate in a green project meeting no later than the design development phase of the project. Attendees must include a participant from all disciplines currently under contract for the project. FGBC recommends that all design team members, construction team members, owners, and occupants are represented at the green team meeting. Virtual meetings are allowed with appropriate documentation.

Points: **Prerequisite - Required**

Intent: To engage all project team members in the green process prior to building design. At a minimum the team meeting shall be used to introduce the FGBC Standard and Checklist to all team members, identify project goals, and complete a preliminary checklist.

Submittals: Provide a meeting agenda, attendee list and sign in sheet (screen capture for virtual meetings), date, location, and time of the meeting and a copy of the resulting preliminary project checklist.

Resources: -

PM1 Building Information Modeling (BIM)

Requirement: Design team and construction teams use BIM process to optimize the efficiencies related to design, estimating, materials ordering, and construction.

Points: **1 point for Architect**
2 points for Architect, Structural, and MEP
5 points for Architect, Structural, MEP, Contractor and Mechanical, Electrical, Plumbing and Fire Subs

Intent: Reduce costs associated with design and construction conflicts by identifying issues prior to construction.

Submittals: Provide a minimum of 6 examples of 3D renderings and conflict reports, Meeting minutes discussing conflict resolution may be submitted in lieu of conflict reports.

PM2 Cost Benefit Analysis

Requirement: FGBC project team member shall document the cost impact of each energy and water credit the project is pursuing for certification. Analysis shall include a minimum of two building alternatives considered to achieve the credit, the cost associated with each alternative and calculated annual kWh, gallons of water, and cost savings. Alternatively, select 3 credits and conduct a cost benefit analysis for 3 energy and or water credits.

Points: **5 points for all Energy and Water credits**
1 point for 3 credits

Intent: To collect data on the life cycle cost and environmental impacts of the energy and water credits of this certification.

Submittals: Provide calculation and a summary spreadsheet of cost benefit analysis. Include assumptions regarding interest rates, life of materials, and any other assumptions made for the analysis. A short narrative must accompany each credit explaining the

options reviewed, environmental benefits, and reasoning for final selection for inclusion in the project.

Resources: -

PM3 Green Education

Requirement: Provide permanently installed signage that educates building occupants and visitors of the sustainable features and benefits that are incorporated into the building. A minimum of 5 signs must be placed in public/common/high traffic areas of the building to receive this credit.

Points: 1

Intent: To educate both building occupants and visitors on the green features and benefits of the building. FGBC also recommends that the signs are made from a green material.

Submittals: Submit a floor plan of the building indicating the location of the signs, the content for each of the 5 signs, and either a graphic design of the sign or a photo of the actual sign.

Resources: -

CATEGORY 2: ENERGY

E Prerequisite 1: Owner Project Requirements (OPR)

Requirement: Owner designated representative must develop a list of owner project requirements related to each of the FGBC categories of the commercial standard. The OPR should indicate minimum goals for each FGBC category and any specific credits the Owner wishes to target.

Points: Prerequisite - Required

Intent: To establish performance criteria for the project as it relates to each of the FGBC Green Commercial Building categories.

Submittals: Submit a narrative explaining the OPR for the project.

Resources: -

E Prerequisite 2: Basis of Design (BOD)

Requirement: Design team representatives develop and document how the building design will achieve the Owner Project Requirements. The Basis of Design should specify how the FGBC goals of the OPR are addressed and how the performance desires of the Owner will be achieved by the proposed design.

Points: Prerequisite - Required

Intent: To assist the design team in fulfilling the Owner project requirements.

Submittals: The design team must submit a narrative that explains how the design decisions support the Owner project requirements.

Resources: -

E Prerequisite 3: Testing and Balancing of Installed Equipment

Requirement: Mechanical Electrical Plumbing (MEP) Engineering Firm works with the Architect or design team leader to verify field installed equipment meet OPR, BOD and is installed and operating correctly. Testing and verification must include at a minimum, Heating, Ventilation, Air Conditioning and Refrigeration (HVAC&R) systems & controls, lighting systems and controls, renewable energy systems, hot water system, and energy and water measurement devices. Testing and verification shall be performed by a licensed engineer or a professional certified by the National Environmental Balancing Bureau (NEBB), the Associated Air Balance Council (AABC), or other nationally accredited organization.

Points: Prerequisite - Required

Intent: To verify that the as built structure performs as the design intended and that the installed equipment is installed and set to the manufacturer's requirements.

Submittals: The design team shall provide a copy of the testing and balancing report.

Resources: -

E Prerequisite 4: Minimum Energy Performance

Requirement: Building must perform the minimum required by the Florida Commercial Building Energy Code when the building is permitted - as verified by the Energy Gauge Summit Fla/Com software or other state approved performance-based software.

- Points:** Prerequisite - Required
- Intent:** Reduce energy use
- Submittals:** Submit a copy of the Energy Gauge Summit “Total Building Performance Method for Commercial Buildings – Project Summary” (Form 506-2010) or its equivalent) from software approved by the Florida Building Commission that identifies the percent above code minimum the proposed building design has achieved.
- Resources:** www.floridabuilding.org/fbc/committees/energy/Energy_Code_Compliance_Software.html

E Prerequisite 5: Ozone Depletion Potential Management

- Requirement:** Requires that all building HVAC&R systems be free of CFC's and Halons.
When reusing existing base building HVAC equipment, complete a comprehensive 5-year CFC phase-out conversion.
- Points:** Prerequisite - Required
- Intent:** Reduce ozone depletion.
- Submittals:** Mechanical engineer will submit a signed letter declaring that the building’s new HVAC&R systems do not use CFC-based refrigerants or that the existing HVAC&R systems will be phased out in 5 years.
- Resources:** -

E1 EPA Target Finder

- Requirement:** Designated project team member is required to enter baseline building and proposed design building information into the EPA Target Finder Program.
- Points:** 1 point
- Intent:** Target Finder is a no-cost online tool that enables you to set energy targets and receive an EPA energy performance score for projects during the design process. The “Target Rating” uses the EPA energy performance rating of 1-100. 75 or higher denotes ENERGY STAR. An "Energy Reduction Target" is the percentage reduction from the average energy consumption of a similar building in your climate region, i.e. A Target Finder score of 75 indicates that the building performs better than 75% of similar buildings in its region.
- Submittals:** Submit a copy of the printout of the building from the Target Finder Program. Please note that there are instances where the Target Finder database does not have enough information to generate a report for your building type. If you enter your building data and the report results in an error, simply provide a copy of the error report page and you will be awarded 1 point.
- Resources:** www.energystar.gov/index.cfm?c=new_bldg_design.bus_target_finder

E2 Portfolio Manager

E2.01 Input building into Portfolio Manager

- Requirement:** Use EPA Portfolio Manager to baseline and track building design and ongoing performance
- Points:** 1
- Intent:** To assist the project team in benchmarking, tracking, and reporting on their building projects with respect to environmental impacts. Portfolio Manager is an interactive

energy management tool that allows you to track and assess energy and water consumption across your entire portfolio of buildings in a secure online environment. Whether you own, manage, or hold properties for investment, Portfolio Manager can help you set investment priorities, identify under-performing buildings, verify efficiency improvements, and receive EPA recognition for superior energy performance.

Submittals: Submit a printout showing the project listed in Portfolio Manager

Resources: <https://www.energystar.gov/istar/pmpam/>

E2.02 Grant FGBC access to the project Portfolio Manager Account

Requirement: FGBC is given access to the building information within Portfolio Manager.

Points: 1

Intent: To allow FGBC to collect performance data on FGBC Certified Projects.

Submittals: User name and password (access information) for Portfolio Manager

Resources: <https://www.energystar.gov/istar/pmpam/>

E3 Commissioning

E3.01 Fundamental Building Systems Commissioning

Requirement: Fundamental Building Systems Commissioning: Implement or have a contract in place to implement all of the following fundamental best practice commissioning procedures. Commissioning includes verifying installation, functional performance testing, training and documentation for EACH of the commissioned system or components as compared to the design intent, training of owner designated O&M professional and completion of the operation and maintenance manuals.

The minimum requirements for serving as the commissioning agent are:

1. Must have served as the commissioning agent of record on at least two (2) projects certified by a state or nationally recognized green certification program, OR
2. Participated in the commissioning of at least two (2) green certified projects and have a letter of recommendation from the project's commissioning agent of record, OR
3. Possess one of the following designations:
 - a. CPMP - Commissioning Process Management Professional Certification (ASHRAE)
 - b. BCxP – Building Commissioning Professional (ASHRAE)
 - c. CEM - Certified Energy Manager (AEE - Association of Energy Engineers)
 - d. PE - Professional Engineer
 - e. ACG Commissioning Agent - (ACG - AABC Commissioning Group)

The commissioning agent (CxA) be an independent party hired by the owner, reporting to the owner. If the CxA is contracted as part of the design or construction team, the CxA must have in their contract that they report directly to the owner with respect to performance verification and they must disclose any

involvement with the design team to verify unbiased ability to verify OPR and BOD.

Points: 4

Intent: Verify that the OPR and BOD have been met, identify equipment shortcomings and verify corrections to failures of equipment start-up or inadequate operations

Submittals: Submit a copy of the CxA signed contract (black out fees), OPR, BOD, Commissioning Plan and Commissioning Report. The commissioning Plan should include an overview of the commissioning process, a list of systems and features, the commissioning participants and their roles, a communication and management plan, an outline of the scope of commissioning tasks, and a schedule. Where possible, include copies of the completed startup checklists. The commissioning report should contain the analysis of whether each commissioned system or component meets the design intent, specifications, was properly installed, passed the functional performance tests, was properly documented in the O&M manuals, and was covered in the operator training.

Resources: <http://www.wbdg.org/project/buildingcomm.php>

E3.02 Advanced Building Systems Commissioning

Requirement: In addition to fundamental commissioning, retain a CxA prior to completing the design phase of the project.

The CxA, in addition to the Fundamental Building Commissioning, must:

1. Conduct a focused review of the design prior to the construction documents phase.
2. Conduct a focused review of the drawings and specifications near completion of the construction documents phase and prior to issuing them for construction.
3. Review the contractor submittals relative to systems being commissioned.
4. Provide information to the owner in a single document (manual) that is required for re-commissioning building systems.
5. Within one year after construction completion date, have a contract in place to review building operation with O&M staff, including a plan for resolution of outstanding commissioning-related issues.

Points: 5

Intent: Verify and ensure that the entire building is designed, constructed and calibrated to operate as intended.

Submittals: Copy of signed contract explaining scope of work (contract amount may be excluded). Provide a copy of the CxA design document review report provided to the owner and design team, provide a copy of the review notes of the specifications provided to the design team, provide a copy of the owner manual for re-commissioning and copy of building operation review contract.

Resources: <http://www.wbdg.org/project/buildingcomm.php>

E3.03 Additional Building Systems Commissioning

Requirement: Commissioning shall also include building envelope, elevators, commercial kitchen equipment, and any other equipment as recommended by the CxA.

Points: 1

- Intent:** Verify and ensure that the entire building is designed, constructed and calibrated to operate as intended.
- Submittals:** Copy of signed contract explaining scope of work (contract amount may be excluded) and a letter from the CxA or the building owner stating all CxA duties were completed. Also, should include a list of equipment from the CxA that they recommended for additional commissioning.
- Resources:** <http://www.wbdg.org/project/buildingcomm.php>

E4 Energy Performance Improvement

Requirement:

Submit performance based energy calculations indicating **base/required** energy performance for passing Florida Energy code and **designed** building energy performance of the building as designed. For example, if using Energy Gauge Summit® the results report indicates the “Passing Criteria” and the “Design (including any credits) numbers. These are the numbers used to calculate the energy performance percentage better than code used to determine the points received for this credit.

Points: **2 points for each percentage point below Florida Energy Code.**

Up to 60 points**Intent:** Achieve increasing levels of energy performance above the prerequisite standard to reduce environmental impacts associated with excessive energy use.

Energy Performance Improvements greater than 30% below the Florida Energy Code:

It is FGBC’s intent to encourage conservation and the reduction of energy use in the building environment. The FGBC Certification programs are designed to encompass a broad spectrum of green building and sustainable construction practices including energy, water, site, health, materials, and disaster mitigation. If your project achieved the required minimum points in each category the project may claim additional points, 2 points for each percentage greater than 31% energy use reduction, in the innovative credit category.

Submittals: Submit a copy of the FLA/COM Form 400A

Resources: <http://www.energygauge.com/flacom/>

E5 Renewable Energy Production

Requirement: Supply a fraction of the building’s total energy use (as expressed as a fraction of annual energy cost) through the use of on-site renewable energy systems.

Points: 1 point per 1% of the building power provided. Maximum 20 points.

Intent: Encourage improved efficiencies and reduce reliance on non-renewable energy sources.

Submittals: Provide a copy of the contract for the purchase of renewable energy indicating the types of renewable purchased and the total kWh of energy production capacity.

Resources: -

E6 Green Power

Requirement: Provide a percentage of the building's electricity from renewable sources by engaging in at least a one-year renewable energy contract to purchase green power. The Checklist requires that you enter the kWh that are being purchased and the length of the contract.

Points: **1 point for 50% for 1 year**
2 points for 100% for 1 year
3 points for 100% for 2 years

Earn 1 bonus point for Certified Green Power which is provided by renewable generation in Florida.

Intent: Encourage the development and use of grid-source, renewable energy technologies on a net zero pollution basis. Renewable sources are as defined by the Center for Resource Solutions (CRS) Green-e products certification requirements. Green power may be procured from a Green-e certified power marketer, a Green-e accredited utility program, or through Green-e certified Tradable Renewable Certificates.

Submittals: Provide a copy of the signed green power purchase contract.

Resources: -

E7 Daylight Sensors

Requirement: **Install daylight sensors in occupied areas of the building. Earn 1-2 based on the building square footage, not required by code, that has daylight sensors. Note spaces where daylight sensors are not allowed due to safety/security or spaces without windows (or natural light) may be excluded from the square foot calculation.** Daylighting sensors installed shall provide controls that automatically reduce lighting power in response to available daylighting, either by continuous daylight dimming OR a combination of stepped switching and daylight-sensing automatic controls, which are capable of incrementally reducing the light level in step automatically and turning the lights off automatically.

Points: **1 point ≥ 50% of building square footage equipped with daylight sensors**
2 points ≥ 75% of building square footage equipped with daylight sensors

Intent: Reduce energy consumption from lighting by installing sensors that automatically dim artificial lighting when enough daylight is available for the tasks conducted in a given building space.

Submittals: Floor plan with location of daylight sensors, approved submittals and photos of installed sensors.

Resources: -

E8 Occupancy Sensors

Requirement: **Install occupancy sensors in occupied areas of the building. Earn 1-2 based on the building square footage, not required by code, that has occupancy sensors. Note spaces where occupancy sensors are not allowed due to safety/security may be excluded from the square foot calculation.** Occupancy sensors shall be equipped to automatically turn lighting off within 15 minutes of all occupants leaving a space and allow "manual off" control. In addition, all occupancy sensor controls shall be either "manual on" or use bi-level switching coupled with manual-on control ("automatic on" programmed to a low light level combined with multi-level circuitry and "manual on" switching for higher

lighting levels). Where occupancy sensors and daylighting sensors are utilized, the occupancy sensor shall work in conjunction with the daylighting controls.

Core & Shell: Assuming minimum code lighting is installed with 100% coverage of occupancy sensors (so that lighting may not be inadvertently or mistakenly be left on) 1 point may be claimed.

Points: **1 point** ≥ 50% of building square footage equipped with daylight sensors
2 points ≥ 75% of building square footage equipped with daylight sensors

Intent: Reduce energy demand from the building by incorporating occupancy sensors that turn off lighting when an area is not in use.

Submittals: Floor plan indicating the location of the occupancy sensors, approved submittals and photos of installed sensors.

Resources: -

E9 Interior Lighting

Requirement: Building has an “all off” policy where all interior lighting is on timer, or motion sensors with override, so no lights can be left on after regular business hours - except for security lighting.

Points: **1**

Intent: Reduce energy demand from artificial lighting in unoccupied buildings after business hours.

Submittals: Copy of the “all off” policy or lease agreement and a letter from the lighting designer or MEP that explains the installed system, features and benefits.

Resources: -

E10 Lighting Power Density

Requirement: Design and construct such that the average lighting power density for the building, which includes conditioned space and enclosed spaces defined as enclosed with doors, windows and roof (for instance fire truck bay) and which excludes the structures exterior and parking area shall be < 0.8 W/SF.

Points: **1 – 5**
1 point: < 0.8W/SF
2 points: < 0.7W/SF
3 points: < 0.6W/SF
4 points = 0.5W/SF
5 points = 0.4W/SF

Intent: Reduce energy consumption associated with lighting.

Submittals: Signed approved lighting submittal, photos of installed lighting and Watt per square foot calc.

Resources: - <http://www.energygauge.com/>

E11 Exterior Lighting Efficiency

Requirement: Meet or exceed the efficiency requirements of the 2018 IECC Chapter 4 Commercial Energy Efficiency for Exterior Lighting C405.4.2.

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- Points:** 3
- Intent:** Reduce energy consumption associated with lighting.
- Submittals:** Signed approved lighting submittal, photos of installed lighting and Watt per square foot calc.
- Resources:** - <http://www.energygauge.com/>

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LIGHTING ZONE	DESCRIPTION
1	Developed areas of national parks, state parks, forest land, and rural areas
2	Areas predominantly consisting of residential zoning, neighborhood business districts, light industrial with limited nighttime use and residential mixed-use areas
3	All other areas not classified as lighting zone 1, 2 or 4
4	High-activity commercial districts in major metropolitan areas as designated by the local land use planning authority

**TABLE C405.4.2(2)
LIGHTING POWER ALLOWANCES FOR BUILDING EXTERIORS**

	LIGHTING ZONES			
	Zone 1	Zone 2	Zone 3	Zone 4
Base Site Allowance	350 W	400 W	500 W	900 W
Uncovered Parking Areas				
Parking areas and drives	0.03W/ft ²	0.04 W/ft ²	0.06 W/ft ²	0.08 W/ft ²
Building Grounds				
Walkways and ramps less than 10 feet wide	0.5 W/linear foot	0.5 W/linear foot	0.6 W/linear foot	0.7 W/linear foot
Walkways and ramps 10 feet wide or greater, plaza areas, special feature areas	0.10 W/ft ²	0.10 W/ft ²	0.11 W/ft ²	0.14 W/ft ²
Dining areas	0.65 W/ft ²	0.65 W/ft ²	0.75 W/ft ²	0.95 W/ft ²
Stairways	0.6 W/ft ²	0.7 W/ft ²	0.7 W/ft ²	0.7 W/ft ²
Pedestrian tunnels	0.12 W/ft ²	0.12 W/ft ²	0.14 W/ft ²	0.21 W/ft ²
Landscaping	0.03 W/ft ²	0.04 W/ft ²	0.04 W/ft ²	0.04 W/ft ²
Building Entrances and Exits				
Pedestrian and vehicular entrances and exits	14 W/linear foot of opening	14 W/linear foot of opening	21 W/linear foot of opening	21 W/linear foot of opening
Entry canopies	0.02 W/ft ²	0.25 W/ft ²	0.4 W/ft ²	0.4 W/ft ²
Loading docks	0.35 W/ft ²	0.35 W/ft ²	0.35 W/ft ²	0.35 W/ft ²
Sales Canopies				
Free-standing and attached	0.04 W/ft ²	0.04 W/ft ²	0.6 W/ft ²	0.7 W/ft ²
Outdoor Sales				
Open areas (including vehicle sales lots)	0.02 W/ft ²	0.02 W/ft ²	0.35 W/ft ²	0.05 W/ft ²
Street frontage for vehicle sales lots in addition to "open area" allowance	No allowance	7 W/linear foot	7 W/linear foot	21 W/linear foot

E12 Solar Study of Building

Requirement: Project team conducts solar study of project site and building location – To receive this credit the team must document the design or orientation modification that was incorporated into the project to reduce solar heat gain as a result of the solar study.

Points: 2

Intent: Reduce energy consumption by modifying the building design and orientation based on solar study findings.

Submittals: Submit the design or orientation modification that was incorporated into the project to reduce solar heat gain as a result of the solar study. Provide copies of the solar study graphics and outputs.

Resources: -

E13 Energy Monitoring Interface

Requirement: Install a building user feedback system that indicates the real time building energy consumption. The monitoring interface should be available to facility or building manager. If the building uses renewable energy generation on site, the energy generated from renewable sources should also be displayed. To receive 5 points the energy monitoring interface must be centrally located in a public or common space with appropriate signage. To receive 10 points the energy monitoring interface should be available at multiple feedback points and provide an interface at each building occupant work station.

Points: 5 points **Single system in common area**

10 points **System has multiple feedback points AND may be viewed by every building occupant.**

Intent: Improve the energy performance

Submittals: A floor plan showing the location of the energy monitoring interface device(s), approved submittal for system and photos of the device(s) with the installed information sign.

Resources: -

CATEGORY 3: WATER

W Prerequisite 1 No Invasive Plants

Requirement: Landscape comprised of no invasive plants.

Points: **Prerequisite - Required**

Intent: Avoid the spread of invasive plants and promote a Florida Friendly landscape.

Submittals: Landscape plan, plant list and photos of installed landscaping.

Resources: A list of such plants can be found at <http://www.fleppc.org/list/list.htm>

W Prerequisite 2 Irrigation zones for turf and landscape beds are separate

Requirement: Implemented landscape design must separate irrigation zones for turf and landscape beds.

Points: **Prerequisite - Required**

Intent: Reduce the amount of supplemental water, potable and non-potable, needed for irrigation.

Submittals: Landscape plan indicating vegetation and irrigation zones, location, and type of controller. Photos of installed landscaping.

Resources: <http://www.sjrwmd.com/floridawaterstar/index.html> and Florida Friendly Best Management Practices for Protection of Water Resources by the Green Industries, <http://www.floridayards.org/>

W Prerequisite 3 Rain shut off device installed CORRECTLY and operable

Requirement: **Verify correct** installation of a Rain shut off device for irrigation per Florida Statutes 373.62 effective May 1, 1991 and field verify that the device is operating correctly

Points: **Prerequisite - Required**

Intent: Reduce the amount of supplemental water, potable and non-potable, needed for irrigation.

Submittals: Field inspection report signed by a responsible team member indicating that the rain shut off device is correctly functioning.

Resources: Florida Statutes 373.62

W Prerequisite 4 Drought Tolerant Landscape, 25%

Requirement: Landscaped area is a minimum of 25% Drought Tolerant Plants

Points: **Prerequisite - Required**

Intent: Reduce the amount of supplemental water, potable and non-potable, needed for irrigation.

Submittals: Plant list for the project specifically identifying Florida Friendly low water plants and calculation of percent drought tolerant vegetation.

Resources: To obtain a list of drought tolerant plants and trees for your area, contact your local water management district, consult the Waterwise Florida Landscapes publication, or consult with a FY&N professional, Master Gardener, Florida WaterStar or WaterSense Certifier. For References here are some helpful websites:

<http://www.sjrwmd.com/waterwiselandscapes/>, <http://fyn.ifas.ufl.edu>,
<http://www.floridawaterstar.com>.

W1 Interior water use reduction

W1.01 Toilets

Requirement: All installed toilets must have a minimum MaP (Maximum Performance) rating of 800 OR are WaterSense Certified. For Dual Flush toilets, to receive one point, ONE of the two flush options must be ≤ 1.1 gpf. Points available for this credit are listed below.

Points:

1 point	all toilets ≤ 1.28 gallons per flush (gpf)
1 point	all dual flush with one flush option ≤ 1.6 gpf and one ≤ 1.1 gpf
2 points	all dual flush (one flush option must be < 1.1gpf) or single-flush toilets with ≤ 1.1 gpf
3 points	all toilets are single flush < 1.1 gpf

Intent: Toilets represent the largest source of indoor water use in buildings, accounting for up to 30%-40% of water demand. The Florida building code and National Energy Policy Act of 1992 (EPACT) require that all installed toilets be rated at a maximum flow rate of 1.6 gallons/flush. There are toilets on the market today that exceed these standards.

To make it easy to find and select water-efficient products with good performance, the EPA (Environmental Protection Agency) has introduced its WaterSense® program, a label that's backed by independent testing and certification. WaterSense®-labeled products perform their intended functions as well as or better than their less-efficient counterparts. And generally speaking, they're about 20 percent more water-efficient.

Submittals: Signed approved submittal and photos of installed fixtures.

Resources: For a list of high efficiency commodes that have earned the WaterSense® label, visit <http://www.epa.gov/watersense/pp/het.htm>. For MaP ratings of commercial (flushometer) toilets, select "Reports" from <http://www.veritec.ca> (Veritec Consulting, Inc.). For MaP and Water-Sense combined results for Toilets (commercial and non), visit http://www.cwwa.ca/freepub_e.asp.

W1.02 Urinals

Requirement: All installed urinals must have flow rate of less than 0.5 gpf or be waterless.

Points:

1 point	all urinals ≤ 0.5 gpf
2 points	all urinals ≤ 0.125 gpf (1 pint)
3 points	Waterless urinals

Intent: Reduce potable water used inside the building

Submittals: Signed approved submittal and photos of installed fixtures.

Resources: -

W1.03 Lavatory Faucets

Requirement: All lavatory faucets must be low flow, WaterSense, or sensor faucets to achieve this credit. Points available are listed below

Points:

- 2 points all lavatory faucets are ≤ 1.5 gpm
- 3 points all lavatory faucets are ≤ 0.5 gpm
- 3 points Motion Sensor self-closing faucet (0.25 gal/metering cycle Max)

Intent: Reduce potable water used inside the building
Submittals: Signed approved submittal and photos of installed fixtures.
Resources: -

W1.04 Kitchen Faucets

Requirement: All kitchen faucets must have a flow rate less than or equal to 2.2 gpm. Points available are listed below.

- 1 point all kitchen faucets are ≤ 2.0 gpm
- 2 points all kitchen faucets are ≤ 1.5 gpm

Intent: Reduce potable water used inside the building
Submittals: Signed approved submittal and photos of installed fixtures.
Resources: -

W1.05 Showerheads

Requirement: All Installed showerheads with flow rate less than or equal to 2.2 gallon per minute (gpm). Points available are listed below

- 1 point all showerheads are ≤ 2.2 gpm
- 2 points all showerheads are ≤ 2.0 gpm
- 3 points all showerheads are ≤ 1.75 gpm

Intent: Reduce potable water used inside the building
Submittals: Signed approved submittal and photos of installed fixtures.
Resources: -

W1.06 Dishwashers

Requirement: All installed dishwashers must be Energy Star qualified with a Water Factor (WF) of 7.0 or less. Dishwashers installed in commercial kitchens must be Energy Star Qualified.

- 1 point all dishwashers are Energy Star Qualified with Water Factor (WF ≤ 7.0)
- 2 point all dishwashers are Energy Star Qualified with Water Factor (WF ≤ 5.8)

Intent: Reduce the amount of potable water used inside the building
Submittals: Signed approved submittal and photos of installed fixtures.
Resources: -

W2 Greywater Reuse

W2.01 Air conditioner condensate collected and used to reduce potable water use

Requirement: Greywater system is installed to reduce demand on potable water. System must have a specific collection source and a dedicated use. Greywater system is installed to reduce

demand on potable water. System must have a specific collection source and a dedicated use.

Points: 1 point

Intent: Reduce the consumption of potable water by using alternative sources. For example, air conditioner condensate could be used to refill site water features, used for irrigation, or as make-up water chillers.

Submittals: Construction drawings indicating design and location of system

Resources: -

W2.02 Greywater System - dual piping system is installed throughout building

Requirement: Greywater system is installed to reduce demand on potable water. System must have a specific collection source and a dedicated use. Greywater system is installed to reduce demand on potable water. System must have a specific collection source and a dedicated use.

Points: 3 point

Intent: Reduce the consumption of potable water by using alternative sources. For example, water from lavatory sinks could be used to refill site water features, used for irrigation, or as make-up water chillers.

Submittals: Construction drawings indicating design and location of system

Resources: -

W3.01 Rainwater Harvesting

Requirement: Install rainwater harvesting collection and storage system. The minimum requirement for this credit is a simple collection system, which for all intents and purposes would be for demonstration. Achieve additional points, per the break down below, as the rainwater collection system increases in functional use to replace both potable and non-potable water.

1. Simple Collection: Used to supplement irrigation and for demonstration purposes.
2. Dedicated use for irrigation: Harvested Rainwater is used to supply irrigation to landscape.
3. Rainwater is collected and used in lieu of potable water for flushing toilets and urinals: Rainwater is collected and fed to dual piping system as greywater to reduce potable water demand inside the building.
4. Collected and treated to potable standards for whole building use: Water is treated to potable standards and supplements whole building water use

Points:	1 point	Simple Collection
	3 points	Collection with dedicated use for irrigation
	5 points	Collection for toilet/urinal flushing
	10 points	Rainwater is collected and treated to potable standards for use throughout the building.

Intent: Decrease both potable and non-potable water use by collecting and using rainwater. With an average rainfall of 54 inches/year in the state of Florida (compared to the national average of 27 inches/year), harvested rainwater is an excellent source of water for landscape irrigation, chiller water make-up, some industrial uses, greywater (toilet and urinal flushing) and with minimal treatment can be made potable for consumption. Rainwater is generally harvested from a roof surface, and system components include properly designed gutters, piping, roof washes, screens, and storage tank/cisterns.

Submittals: Construction drawings indicating design and location of system, signed approved submittal of system installed and photos of installed system.

Resources: For more information consult A Guide to Environmentally Landscaping: Florida Friendly Landscape Handbook or visit

http://fyn.ifas.ufl.edu/materials/FYN_Handbook_vSept09.pdf

Additional information on rainwater harvesting can be found at:

<http://rainwater.sustainablestudies.com/> and

<http://www.toolbase.org/TechInventory/TechDetails.aspx?ContentDetailID=918&BucketID=6&CategoryID=11>.

W4 Installed Landscape

W4.01 Florida Friendly Drought-Tolerant Landscape

Requirement: Use of at least 60% of the plants and trees incorporated into the landscape are from a local drought tolerant list; 2 points are available if 80% are from such a list; and 3 points are available if 100% of the plants and trees are from such a list. A minimum of twelve total plants must be present in the landscape to qualify for the credit.

Points:

1 point	≥ 60% and < 80% Drought Tolerant Florida Friendly
2 points	≥ 80% and < 100% Drought Tolerant Florida Friendly
3 points	100% Drought Tolerant Florida Friendly

Intent: Decrease the water resources used to irrigate landscape

Submittals: Letter verifying compliance with the criteria is signed by one of the following: the landscape architect, a WaterStar or WaterSense Certifier, a Florida Friendly Landscape representative, or a Master Gardener. The team may also provide a list of installed plants and the corresponding plant drought tolerance rating according to Florida Friendly Landscape database. <http://www.floridayards.org/fyplants/index.php>

Resources: To obtain a list of drought tolerant plants and trees for your area, contact your local water management district, consult the Waterwise Florida Landscapes publication, or consult with a FY&N professional, Master Gardener, or Florida WaterStar or WaterSense Certifier. For References here are some helpful websites:

<http://www.sjrwmd.com/waterwiselandscapes/>, <http://fyn.ifas.ufl.edu>,

<http://www.floridawaterstar.com/floridawaterstar/>.

W4.02 Turf/Sod Percentage

Requirement: Turf is installed on less than 50% of landscape, install drought tolerant turf, Bahia, Zoysia, or Bermuda grass in sunny areas (<20% shade on June 21) and do not use turf is used in densely shaded areas (>60% shade on June 21).

Points:	1 point	< 50% Turf/sod
	2 point	< 40% Turf/sod
	3 point	< 30% Turf/sod
	4 point	< 20% Turf/sod
	5 point	< 10% Turf/sod

Intent: Turf is generally the largest consumer of water in the landscape, and most types will not flourish in shady areas. Use of drought tolerant plants in shaded areas

Submittals: Site plan indicating total SF of site and total SF of turf, turf calculation as a percentage of the site and or turf square footage as purchased on the plant list invoice.

Resources: -

W4.03 No Installed Irrigation

Requirement: Landscape contains no permanently installed irrigation system.

Points: 10

Intent: Reduce both potable and non-potable water used for irrigation

Submittals: Copy of landscape plan and letter from the building owner stating that no permanent irrigation will be used at the site

Resources: -

W4.04 All plants/trees selected to be compatible with local environment / microclimate

Requirement: All plants (including shrubs, groundcovers, and vines and trees) are compatible with their location in the landscape

Points: 2

Intent: Even if preferred native, drought tolerant, and low maintenance plants are selected for the landscape, many times the plants are installed in areas of the landscape where they are not likely to remain healthy due to various sun/shade and soil type requirements. Incompatibility between the plant(s) and their placement results in over watering and over fertilizing.

Submittals: Landscape plan and plant list. Letter verifying compliance with the criteria is signed by one of the following: the landscape architect, a WaterStar or WaterSense Certifier, a Florida Friendly Landscape representative, or a Master Gardener.

Resources: <http://floridayards.org/fyplants/index.php>

W4.05 Plants with similar maintenance grouped together

Requirement: Landscape is planned and installed according to plant maintenance requirements such that similar maintenance plants are grouped together.

Points: 2

Intent: Grouping plants with similar maintenance requirements together increases irrigation efficiency. Lawns that require a lot of water from sprayers and rotors should not be watered in the same irrigation zone as drought-tolerant plants that require less water and that can be efficiently irrigated with micro-irrigation (micro-spray jets, drip systems, bubblers, or soaker hoses).

Submittals: Landscape plans and photos of installed vegetation. Letter verifying compliance with the criteria is signed by one of the following: the landscape architect, a WaterStar or WaterSense Certifier, a Florida Friendly Landscape representative, or a Master Gardener.

Resources: -

W4.06 Mulch (non-cypress) applied 3"-4" deep

Requirement: Apply 3-4" of mulch around plants and trees (extending out to drip line) and in landscaped beds avoiding volcano mulching.

Points: 2

Intent: In addition to preventing weed growth, a thick layer of mulch will help retain soil moisture, retard erosion, cool the soil surface, and reduce some soil pests. Mulching around trees also reduces damage from mowers and line trimmers. It is important to avoid volcano mulching (a cone of piled mulch placed around newly installed plants and trees). This practice can hold moisture against the tree and encourages rot in the trunk.

Submittals: Landscape plans and photos of installed mulched vegetation

Resources: http://fyn.ifas.ufl.edu/materials/FYN_Handbook_vSept09.pdf



Incorrect Volcano Mulching



Correct Installation

W5 Water Conservation Certifications

W5.01 Meet or exceed Florida WaterStar™ or WaterSense Standards

Requirement: Meet the WaterStar™ or WaterSense certification program requirements.

Points: 5

Intent: Florida WaterStar™ is a voluntary, third-party certification program designed to increase water efficiency in landscapes, irrigation systems and indoor uses. While many certification programs provide general guidelines for water efficiency, Florida WaterStar™ specifically addresses uses relevant to Florida.

WaterSense® labeled new homes will combine WaterSense® labeled products with other water-efficient fixtures and practices to reduce the amount of water used by approximately 20 percent. Homes must meet criteria in three areas: indoor water use, outdoor water use, and homeowner education.

Submittals: Copy of certificate

Resources: <http://www.sjrwmd.com/floridawaterstar/index.html>
www.epa.gov/watersense/

W5.02 Florida Friendly Landscape™ Program Certification

Requirement: Obtain Florida Friendly Landscaping™ Program New Construction Certification

Points: 2

Intent: Florida-Friendly Landscaping™ offers a certification program for new construction throughout the state. The new construction checklist for builders and developers for certification of Florida-Friendly Landscaping™ includes design criteria that help drive maintenance of landscapes in a Florida-Friendly way; that is through less use of irrigation, fertilizers and pesticides. The certification criteria embrace the nine principles of Florida-Friendly Landscaping™ which are: Right plant, right place; water efficiently; fertilize appropriately; mulch; attract wildlife; manage yard pests responsibly; recycle yard waste; reduce stormwater runoff; and protect the waterfront. Florida-Friendly Landscapes, as defined in 2009 Florida Statutes, Ch. 373, are landscapes which are: "...quality landscapes that conserve water, protect the environment, are adaptable to local conditions, and are drought tolerant." For more information, contact the county UF/IFAS Extension office. Many of the criteria dovetail with other green certification programs.

Submittals: Copy of certificate

Resources: http://fyn.ifas.ufl.edu/materials/FYN_Handbook_vSept09.pdf
<http://fyn.ifas.ufl.edu/>

W6 Installed Irrigation

Requirement: Irrigation must comply with all of the following to achieve Installed Irrigation W6 credits. To receive points for Installed Irrigation, each system must have the following features:

1. **Separate zones for turf and landscape beds – multi program controller:** It is recommended that the irrigation systems be calibrated to supply less than ¼" of water per zone, per application. The controller must be a multiple program controller that can divide the landscape into zones and operate the different zones for different lengths of time. The controller must have a battery backup to retain system settings and include a functioning rain sensor in an operable location as required by Florida Statute 373.62.
2. **High volume irrigation does not exceed 60% of the landscape area:** Landscape zones requiring a high volume of water supplied by rotors or spray heads cannot exceed 60% of the landscape area.
3. **Head to head coverage for rotor/spray heads:** Many irrigation system designs incorporate spray/rotor head pattern overlap to ensure complete coverage. In order to minimize over watering in the overlap zone, one emitter's coverage pattern should not extend past adjacent emitters.
4. **Micro-irrigation only in landscape beds and narrow areas:** Landscape features other than turf can be watered much more efficiently by using micro-irrigation rather than sprayers and rotors. Equipment such as drip emitters, bubblers, micro-spray jets, and soaker hoses deliver water precisely where it is needed. In contrast, much of the water emitted from sprayers and rotors is blown away by wind or evaporates. In addition, narrow areas that are 4 ft. wide or less are difficult to irrigate effectively with rotor or spray heads, for most patterns are greater than 4 feet in diameter. Micro-irrigation is a better choice for irrigating narrow areas.
5. **Minimize overspray on impermeable surfaces:** The irrigation system must be visually inspected while operating to ensure that no irrigation water is directed to areas not intended to be watered (driveway, street, etc.). The system must also not direct water onto walls of the house.

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6. **In poor drainage (low) areas, heads are installed with check valves:** Equipment with check valves must be used in some areas to prevent low pressure drainage. Low pressure drainage is a situation in which the system drains to the lowest head and resultant water flows onto or over adjacent property, non-irrigated areas, walks, roadways, or structures. Not only could this be a localized wet spot problem, but it also wastes the water that is in the zone piping each time the system runs. To help prevent this situation, heads with check valves need to be installed if there is over an 18 inch difference in elevation or if there is undulating terrain.
7. **Provide building owner and or facility manager with plan and instructions:** The building owner and the facility manager should receive a copy of as built plans, operating manuals, and warranties. The package should also include a general irrigation schedule with recommendations and instructions on modifying the schedule for local climatic and growing conditions. Each of the following items should be installed adjacent to the controller or in an easily accessible weather-protected area:
 - a. Controller handbook/operating instructions
 - b. Zone diagram
 - c. Specific zone application rates and maintenance run times
 - d. Soil moisture sensor probe location (when applicable)
8. **Irrigation heads have matched precipitation rates:** Matching precipitation rates allows for sprinklers with various arcs and radii to be included in the same zone and each deliver the same target application rate.
9. **Pop-up sprinkler heads significantly rise about turf grass height:** If heads do not pop up sufficiently above turf, the uniformity of distribution will not be adequate and will result in poor coverage.
 - a. A minimum of 5-inch sprinkler heads for St. Augustine, Zoysia and Bahia grasses
 - b. A minimum of 4-inch sprinkler heads for centipede, Bermuda and seashore paspalum

Points: 15

Intent: Use water correctly to irrigate landscape only when necessary

Submittals: Irrigation system design drawing as installed and irrigation schedule.

Resources: <http://www.sjrwmd.com/floridawaterstar/index.html> and Florida Friendly Best Management Practices for Protection of Water Resources by the Green Industries, <http://www.dep.state.fl.us/water/nonpoint/docs/nonpoint/grn-ind-bmp-en-12-2008.pdf>

CATEGORY 4: SITE

S Prerequisite 1: Stormwater Pollution Prevention Plan (SWPPP) and Florida Department of Environmental Protection (FDEP) Notice of Intent (NOI) onsite

Requirement: Keep copy of SWPPP & FDEP National Pollutant Discharge Elimination System (NPDES) Notice of Intent (NOI) onsite for contractor to implement & maintain SWPPP Best Management Practices (BMP) as designed by civil engineer or SWPPP designer. For projects less than 1 acre, implement SWPPP on site as designed by the project Civil Engineer.

Points: **Prerequisite - Required**

Intent: Reduce the quantity and improve the quality of stormwater discharge that leaves the jobsite.

Submittals: Details of stormwater pollution prevention plan and photos of installed stormwater pollution prevention measures.

Resources: -

S1 FDEP Professional

Requirement: The general contractor has on staff or contracts with a FDEP Certified Erosion and Sedimentation Control Professional (Tier 2).

Points: 3

Intent: Increase the proper design, construction, and maintenance of erosion and sediment control during construction to assure the proper long term operation and maintenance of stormwater systems after construction is complete.

Submittals: Name of Certified FDEP Professional and a copy of the page of the permit application identifying the FDEP individual and their contact information.

Resources: www.dep.state.fl.us/water/nonpoint/erosion.htm

S2 Site Selection

S2.01 Select Appropriate Site

Requirement: Do not develop buildings, roads, or parking areas on portions of sites that meet any one of the following criteria:

- Prime farmland as defined by the United States Department of Agriculture.
- Land which elevation is lower than 5 feet above the elevation of the 100-year flood as defined by FEMA.
- Land that is specifically identified as habitat for any species on Federal or State threatened or endangered lists.
- Within 100 feet of any water including wetlands as defined by 40 CFR, Parts 230-233 and Part 22, and isolated wetland or areas of special concern identified by state or local rule OR greater than distances given in state or local regulations as defined by local or state rule or law, whichever is more stringent.

Land which prior to acquisition for the project was public parkland, unless land of equal or greater value as parkland is accepted in trade by the public landowner (Park Authority projects are exempt).

Points: 1

Intent: Avoid development of environmentally sensitive sites.

Submittals: Provide a site plan, in context, so the credit criteria may be verified and a letter from the building owner or civil engineer confirming site as appropriate.

Resources: -

S2.02 Urban Growth Boundary

Requirement: Locate building on a site that is located inside the designated Urban Growth Boundary

Points: 1

Intent: Reduce the need for additional infrastructure to service the building.

Submittals: Map of Urban Growth Boundary with project site identified.

Resources: Local Government Website – Planning Department

S2.03 Permit Ready Site

Requirement: Locate building on a site that is listed as "Permit Ready" and designated by local government as preferred growth area.

Points: 1

Intent: Respect the municipal governments planning for development.

Submittals: Letter from the local government indicating that the site is "permit ready" or a preferred site targeted for development.

Resources: Local Government Website – Planning Department

S2.04 Greyfield/Redevelopment of an existing site

Requirement: Locate the building on a site that has existing hardscape or other structure that must be replaced. To achieve this credit, the site must have utility connections available within 1/8 mile boundary.

Points: 3

Intent: Encourage redevelopment, increase density and reduce the need for additional infrastructure.

Submittals: Copy of a site plan with the existing conditions at the time of permit application. Copy of Civil demolition plan

Resources: Many economic development boards have a list of existing sites ready for redevelopment.

S2.05 Brownfield Redevelopment

Requirement: Development of any EPA or Federal/State/Local Government Classified Brownfield and provide remediation as required by EPA's Sustainable Redevelopment of Brownfields Program.

- Points:** 5
- Intent:** Rehabilitate and use damaged sites
- Submittals:** Provide a copy of the Phase II Environmental Site Assessment OR a letter from a local, state or federal regulatory agency confirming that the site is classified as a brownfield.
- Resources:** <http://epa.gov/brownfields/>

S2.06 Access to Public Transportation

- Requirement:** Site is located within 1/2 mile of an existing or funded rail node OR within 1/4 mile of at least 1 active bus stop (this can be measured as the crow flies).
- Points:** 2 – 4
- 2 Points:** 1 route within ¼ mile
- 3 Points:** 2-4 routes within ¼ mile
- 4 Points:** 5+ routes within ¼ mile
- Intent:** Reduce traffic, greenhouse gas emissions, need to expand roadways and overall pollution from automobile use.
- Submittals:** Regional/Local drawing or transit map highlighting the building location and the fixed rail stations and bus lines and indicate the distances between them. Include a scale bar for distance measurement.
- Resources:** Local jurisdiction website.

S2.07 Adjacent to dense residential development

- Requirement:** Locate the building on a site that is within 1 mile of residential developments with the minimum density of 10 units per acre (this can be measured as the crow flies).
- Points:** 1
- Intent:** Locate commercial buildings close to densely populated areas to reduce vehicle miles traveled.
- Submittals:** Area map that identifies adjacent properties, their use, and the building site.
- Resources:** -

S2.08 Access to Basic Services

Requirement: Locate the building on a site that is within 1/2 mile of and has safe and walkable access to basic services (this can be measured as the crow flies). Each type of service may only be counted once, i.e. if there are 3 banks, for the purposes of this checklist that is equal to ONE service. Services include:

Arts and entertainment center	Local Government Facility
Bank	Medical or dental office
Beauty Shop	Pharmacy
Bike Share Station	Place of worship
Civic Center	Police station
Community Center	Post office
Convenience store	Restaurant

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Daycare center	School
Dry Cleaners	Senior Care Facility
Fire station	Supermarket
Fitness center or gym	Theater
Laundromat	
Library	Other Neighborhood-serving retail
Other office building or major employment center	

Points:

1 point

awarded for each 3 unique services

Intent:

Reduce vehicle miles traveled by locating building close to basic services.

Submittals:

Aerial context map with building location, and location and type of basic services within ½ mile.

Resources:

-

S3 Site Enhancement

S3.01 Wetland Protection and Enhancement

Requirement: Sites located within 100 feet of wetlands shall restore the wetland and provide a minimum of a 25-foot buffer of uplands that include native vegetation, no irrigation, and signs indicating that the area is a restored natural area.

Points:

2

Intent:

Minimize the impact and restore the wetlands.

Submittals:

Site map identifying wetlands, plant list and restoration plan, delineating 25' upland buffer and showing that no irrigation will be installed within the 25' upland buffer.

Resources:

-

S3.02 Minimize Site Disturbance

Requirement: The maximum square footage of the site that may be disturbed, excluding the building footprint, must be less than or equal to the building footprint.

Points:

1

Intent:

Minimize site disturbance.

Submittals:

Copy of project site indicating building footprint, square footage of building footprint and outlining site cleaning operation boundaries and staging areas. Provide photos of site demonstrating minimal site disturbance.

Resources:

-

S3.03 Site Open Space

Requirement: Exceed minimum zoning requirements for open space by 25%. Stormwater retention/detention areas may be included in the open space calculations if they are specifically designed for dual use/function, for example, recreation areas that function as dry detention may be included in the calculation. Earn additional points for shaded open

space: a minimum of 50% of the open space must be shaded by structures or vegetation within 10 years.

Points: 2 points: Increased Open Space

4 points: Increased Shaded Open Space

Intent: Provide natural open space with shade to reduce the heat islands around the building, provide building occupants with outdoor spaces, and enhance the environment with trees.

Submittals: Provide a site plan with the building footprint, square footage of building footprint (or a copy of the local zoning open space requirements) that shows the designated open space and landscape plan. If claiming shaded area using trees, also provide a list of trees and their projected canopies after 10 years.

Resources: -

S3.04 Sidewalks

Requirement: Provide sidewalks for all paths marked for use by the building occupants. Sidewalks shall be a minimum of 4' wide, stable, firm, slip-resistant materials.

Points: 1

Intent: Improve the walkability and safety of the site.

Submittals: Site plan showing sidewalks and photos of completed installed sidewalks.

Resources: -

S3.05 Connectivity

Requirement: Provide connections to adjacent sites via sidewalks, bike paths, and trails.

Points: 1

Intent: Improve the connectivity of the community and encourage pedestrian and bike traffic.

Submittals: Site plan showing connections and trails. Include photos of completed site identifying connectivity features.

Resources: -

S4 Reduce Heat Islands – Hardscape

S4.01 Minimize Provided Parking

Requirement: Parking provided on site must be 10% less than the parking required by the local land development codes.

Points: 2

Intent: Reduce areas that may be impervious, create heat islands, or discourage use of multimodal transportation. Design team must work with the local jurisdiction to reduce the typically required parking by proposing shared parking or other multimodal transportation methods.

Submittals: Provide a letter from the project team or a copy of the plans showing the required and provided parking. Provide additional documentation and explanations if reductions via waivers were factors in the required or provided parking numbers.

Resources: -

S4.02 Under Building Parking

Requirement: A minimum of 50% of the space under the building shall be used for parking.

Points: 3

Intent: Reduce heat islands, reduce impervious surface, and raise the finish floor elevation (FFE) for disaster mitigation.

Submittals: Provide construction drawings and photos of structured parking.

Resources: -

S4.03 Shaded, Covered or High Albedo Hardscape

Requirement: Shade, cover or use high albedo hardscape for a minimum of 40% of the site hardscape. For the purpose of this credit site hardscape includes roads, sidewalks, courtyards, amenity decks, and parking lots. Areas square footage that may be included in this calculation are hardscape shading by trees within 10 years, structures with roof materials with an SRI ≥ 78 or an LRV ≥ 50 , structured parking or hardscape with an SRI > 35 . The building footprint, i.e. square footage of roof is NOT considered hardscape unless used as a rooftop terrace amenity. Hardscape shaded by photovoltaic panels or other systems that are generating electricity can be included in the shade square footage calculation and are exempt from meeting the SRI ≥ 78 requirement.

Points: 2 point: 40% hardscape coverage

3 point: 60% hardscape coverage

4 point: 80% hardscape coverage

Intent: Reduce heat islands of the developed site.

Submittals: Provide a site plan identifying all the site features and hardscape quantities. Provide approved submittals and photos of hardscape materials and photos of installed hardscape. .

Resources: -

S4.04 Alternative Fuel Vehicles

Requirement: Provide preferred parking and or accommodations based on the requirements listed below, for alternative fuel, hybrid, high capacity or electrical vehicle. Points are available based on the percentage of preferred parking and type of accommodations installed.

Points: 1 - 4

1 point: 3% of the total parking spaces provided are designated for alternative fuel, hybrid, high capacity or electrical vehicle

1 point: 10% of the total parking spaces are designed and constructed to include conduit and dedicated electrical capacity that will allow for non-invasive installation of electric chargers at a future date

- 2 points:** 1.5% of the total parking spaces provided are designated for electrical vehicle charging. Provide a minimum of one 220 volt 40 Amp outlet at each parking space
- 3 points:** 3% of the total parking spaces provided are designated for electrical vehicle charging. Provide a minimum of one 220 volt 40 Amp outlet at each parking space

Intent: Reduce pollution and land development impacts from automobile use.
Submittals: Plan identifying location of preferred parking, description of charging apparatus and photos of installed equipment
Resources: -

S5 Reduce Heat Islands - Roof

Requirement: To qualify for this credit, the roof materials must be Energy Star, have an SRI ≥ 78 or be a vegetated roof structure. If vegetated, the vegetated roof must have a minimum of 80% Florida friendly low water vegetation installed. One point is awarded for each 20% of roof area that is reflective, vegetated, or shaded by solar electric devices. The Checklist requires that you enter the total square footage of the roof and the square footage of Energy Star, high reflectance, and vegetated roof. It will return the percentage and award points.

- Points:**
- 1 point** $\geq 20\%$ and $< 40\%$ Energy Star, reflective or vegetated roof
 - 2 points** $\geq 40\%$ and $< 60\%$ Energy Star, reflective or vegetated roof
 - 3 points** $\geq 60\%$ and $< 80\%$ Energy Star, reflective or vegetated roof
 - 4 points** $\geq 80\%$ Energy Star, reflective or vegetated roof

Intent: Reduce heat island effect of site development.
Submittals: Provide a roof drawing with area calculations, signed approved submittal of roof materials and photos of installed roofing where possible.
Resources: -

S6 Reduce Heat Islands - Building

Requirement: To qualify for this credit, a minimum of 20% of the exterior wall surface area minus the glazing must have an LRV or SRI > 60 for stucco and painted all finishes, an SRI ≥ 29 for metal and vinyl. Natural and man-made stone products must be light in color and comparable to LRV > 60 paint. If a documented reflectivity is not available, this credit may only be awarded to "white" or "off white" finishes.

- Points:**
- 1 point** $\geq 20\%$ and $< 40\%$ reflectant or shaded exterior wall
 - 2 points** $\geq 40\%$ and $< 60\%$ reflectant or shaded exterior wall
 - 3 points** $\geq 60\%$ and $< 80\%$ reflectant or shaded exterior wall
 - 4 points** $\geq 80\%$ reflectant or shaded exterior wall

Intent: Reduce heat island effect of site development and vertical construction.
Submittals: Provide a cut sheet of the exterior wall coating/paint, shading calculations, and photos of building exterior.
References: www.sherwin-williams.com/architects-specifiers-designers/specs-and-green-solutions/
www.texcote.com/specs.php

S7 Stormwater

S7.01 Less than 10 acres, less than 2 acres of impact (<10<2)

Requirement: Increase the quality of stormwater discharge. One point is available for each 50% improvement in water quality as calculated by the project civil engineer.

Points:

1 point	≥ 50% and < 100% increase in water quality
2 points	≥ 100% and < 150% increase in water quality
3 points	≥ 150% increase in water quality

Intent: Improve natural waterways by minimizing stormwater run-off contaminants.

Submittals: Civil Engineer stormwater calculations.

References:

S7.02 Standard General

Requirement: Increase the quality of stormwater discharge. One point is available for a 50% increase in water quality and a maximum 85% predevelopment discharge. One additional point is available for each 10% decrease in predevelopment discharge.

Points:

1 point	≥ 50% increase in water quality, ≤ 85% and > 75% predevelopment discharge
2 points	≥ 50% increase in water quality, ≤ 75% and > 65% predevelopment discharge
3 points	≥ 50% increase in water quality, ≤ 65% predevelopment discharge

Intent:

Submittals: Civil Engineering stormwater calculations and narrative explaining how the design improves the water quality

References:

S7.03 Treat Stormwater from adjacent sites

Requirement: Collect and treat stormwater from adjacent properties to assist in controlling both the quantity and quality of stormwater in the community. Earn one point for each additional 10% of stormwater volume the project site can retain and treat.

Points:

1 point	Collect and treat an additional 10% to < 20%
2 points	Collect and treat an additional 20% to < 30%
3 points	Collect and treat an additional 30% or more

Intent: Improve the quality of natural waterways by improving the quality of and reducing the quantity of stormwater discharge.

Submittals: Civil Engineering stormwater calculations and narrative indicating quantity and treatment of stormwater collected from adjacent sites.

Resources: -

S7.04 Littoral Vegetation of Manmade Stormwater Detention

Requirement: Littoral zone of man-made stormwater detention basins that function as wet ponds shall have a minimum of 50% of the pond bank vegetated with native wetland plants of diverse species in appropriate locations for the vegetation type. To create this landscaped littoral shelf, the slope between the normal water level elevation and three feet below the normal water level elevation should be no greater than 6:1. Earn one point for 50% of pond bank coverage and earn an additional point for each additional 25% of pond bank coverage.

Points:

1 point	≥ 50% and < 75% of pond bank planted with littorals
2 points	≥ 75% and < 100% of pond bank planted with littorals
3 points	100% of pond bank planted with littorals

Intent: Improve stormwater quality, littoral vegetation reduces the amount and proximity of sod which also reduces the amount of pesticides and fertilizers that enter our waterways.

Submittals: Plant list, detention pond design and photos of final installed stormwater system.

References: -

S7.05 Pervious Hardscape

Requirement: Install pervious hardscape for a minimum of 25% of the site. Site hardscape includes roads, sidewalks, courtyards, and parking lots. Hardscape may be porous pavers (open grid pavers) or permeable pavement (minimum percolation rate of 2 gal/min/SF and a minimum of 6 inches of open graded base below).

Points:

1 point	≥ 25% and < 50% pervious hardscape installed
2 points	≥ 50% and < 75% pervious hardscape installed
3 points	≥ 75% pervious hardscape installed

Intent: Improve quality of stormwater discharge and allow groundwater recharge.

Submittals: Site drawing with pervious hardscape identified, approved submittal of hardscape materials, percolation calculation and photos of installed hardscape.

References:

S7.06 Alternative Stormwater Detention

Requirement: Uses Low Impact Development (LID) alternatives to collect and treat stormwater. Alternative systems that qualify include rain gardens, bio-retention filtration systems, infiltration trenches, and vegetated roofing. A minimum of 50% of the stormwater collection and treatment must use the low impact development treatment system to achieve this credit. Earn one point if 50% of the site stormwater is collected using low LID techniques. Earn an additional point for each additional 25% of total site stormwater that is collected using LID techniques.

Points:

1 point	≥ 50% and < 75% of stormwater is collected using LID techniques
2 points	≥ 75% and < 100% of stormwater is collected using LID techniques
3 points	100% of stormwater is collected using LID techniques

Intent: Improve quality of natural waterways and stormwater discharge.

Submittals: Site design, stormwater calculations, construction details of low impact development designs and photos of final installed stormwater system.

Resources: -

S8 Vehicular Transportation Alternatives

S8.01 Bicycle Storage

Requirement: Project must provide securing locations for minimum of 2 bicyclers (1 bike rack) or 1 bike rack per 5,000 square feet of retail and 5,000 SF of commercial.

Points: 2

Intent: Encourage transportation alternatives to the automobile.

Submittals: Site plan identifying bike racks and cut sheet of bike racks selected.

Resources: -

S8.02 Changing Rooms

Requirement: Project must provide a minimum of 1 changing room per 25,000 SF of building.

Points: 1

Intent: Provide a location for individuals walking or biking to work to change.

Submittals: Floor plan that identifies changing room.

Resources: -

S8.03 Showering Facility

Requirement: Full time occupants have access to a shower facility, free of charge, located on site or in an immediately adjacent facility (within 200 yards). If the showers are located on site, one shower for each 0.5% full time equivalent employee.

Points: 1

Intent: Provide a location for individuals walking or biking to work to change.

Submittals: Floor plan that identifies the showers.

Resources: -

S9 Exterior Lighting (not attached to building)

S9.01 Meets Dark Sky Requirements

Requirement: Do not exceed the light levels and uniformity ratios recommended by the Illuminating Engineering Society of North America (IESNA) Recommended *Practice Manual: Lighting for Exterior Environments* (RP-33-99). Design exterior lighting such that all exterior luminaires with more than 1000 initial lamp lumens are shielded and all luminaires with more than 3500 initial lamp lumens meet the Full Cutoff IESNA Classification. If the bulb exceeds 26W the lights shall be full cut off luminaires so that no light or brightness from those luminaires crosses the property boundary.

Points: 1

Intent: Eliminate light trespass from the building and site, improve night sky access and reduce development impact on nocturnal environments.

Submittals: Provide signed approved submittal and photos of installed lighting

Resources: -

S9.02 Lights Provide >100 lumens/watt

Requirement: Exterior lighting fixtures selected provide a minimum of 95 lumens/watt.

Points: 1

Intent: Provide lighting while reducing energy consumption.

Submittals: Provide signed approved submittal and photos of installed lighting.

Resources: -

S9.03 Lights are Solar Powered

Requirement: Exterior lighting fixtures are equipped with solar panels. Site design and landscape design allow for maximum solar collection over the life of the PV's. Collectors must remain unobstructed from shade from trees (within the site boundaries) for 15 years

Points: 1

Intent: Provide exterior lighting while reducing energy consumption.

Submittals: Cut sheets of lighting fixtures selected and a copy of the landscape plan that indicates mature growth does not obstruct lights.

Resources: -

S9.04 Exterior lighting is on timers or daylight sensors

Requirement: A minimum of 50% of the installed exterior lighting in controlled by timers or daylight sensors

Points: 1

Intent: Reduce energy consumption from lighting by installing sensors that automatically dim artificial lighting in daylight or are set to an automatic timer and are daylight hours . .

Submittals: Provide approved submittal of sensors or timer or lighting submittal indicating sensors are integral to lights. Include Site plan with location of daylight/motion sensors. Provide photos of installed sensors and installed lighting.

Resources: -

CATEGORY 5: HEALTH

H Prerequisite 1: Environmental Tobacco Smoke (ETS) Control

Requirement: No smoking allowed in the building. If smoking is allowed on the site, designated smoking areas must be located a minimum of 25 feet away from all doors, operable windows, HVAC equipment, and fresh air intakes. **No smoking signs must be installed at all main building entrances.**

Points: **Prerequisite - Required**

Intent: Prevent exposure of building occupants and systems to Environmental Tobacco Smoke (ETS).

Submittals: **Photos of no smoking signs installed at all main building entrances are required.** If smoking is allowed on the site, please provide dimensioned site plan indicating designated smoking area indicating the distances to doors and intakes.

Resources: -

H Prerequisite 2: Indoor Air Quality (IAQ) Management Plan, During Construction

Requirement: Indoor Environmental Quality shall be protected during construction according to SMACNA guidelines.

Develop and implement an Indoor Air Quality (IAQ) Management Plan for the construction and pre-occupancy phases of the building as follows:

- During construction meet or exceed the minimum requirements recommended in Design Approaches of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guideline for Occupied Buildings under Construction, 1995.
- Protect stored on-site or installed absorptive materials from moisture damage.
- Replace all filtration media immediately prior to occupancy. Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13, as determined by ASHRAE 52.2-1999 for media installed at the end of construction, and a MERV of 8, for media used to protect HVAC at each return air grill during construction.

Points: **Prerequisite - Required**

Intent: Prevent indoor air quality problems resulting from the construction/renovation process in order to help sustain the long-term health, comfort and well-being of construction workers and building occupants.

Submittals: Provide a written copy of the Indoor Air Quality Management Plan and the specifications indicating use of SMACNA guidelines. Provide photos of installed measures/practices in place during construction of the indoor air quality measures.

Resources: -

H1 Protect, Monitor & Remediate Poor IAQ

H1.01 Carbon Dioxide

Requirement: Systems shall be designed to monitor carbon dioxide (CO₂) within the building and activate an audible alarm w/ corrective action plan such that mechanical air conditioning system can introduce treated fresh air as needed.

- Points:** 1
- Intent:** Provide capacity for indoor air quality (IAQ) monitoring to help sustain long-term occupant health, comfort and well-being.
- Submittals:** Provide copy of approved submittal of equipment provided, plans indicating installed locations. Mechanical engineer may provide a brief narrative indicating system design and function.
- Resources:** -

H1.02 Humidity Monitoring & Control

- Requirement:** Systems shall be designed to monitor humidity within the building and activate an audible alarm w/ corrective action plan. System installed to control building humidity such as a desiccant system, enthalpy wheel, heat pipes, or dual path system. The dehumidification system shall be a centrally located and permanent.
- Points:** 5
- Intent:** Reduce relative humidity inside the building to improve the indoor environment
- Submittals:** Provide a copy of the signed approved submittal of the equipment used for dehumidification. The mechanical engineer must provide calculations and narrative describing the removal of latent heat and humidity range that will be maintained by the system.
- Resources:** -

H1.03 Building Entrance – Outdoor Pollutants

- Requirement:** Project shall employ measures such as permanent walk off grates or mats located at the building main entrance to reduce pollutant contamination of the building entrances. If mats are used, mats must be the width of the door and a minim of 4 feet in the line of traffic. The mats must also include a contract for ongoing cleaning/maintenance or a written maintenance plan.
- Points:** 1
- Intent:** Improve the indoor environmental quality by reducing the amount of pollutants brought inside the building by foot traffic.
- Submittals:** Provide construction detail of the system installed and photos or photos of installed mats and a copy of the maintenance plan/contract.
- Resources:** -

H1.04 Building Entrance – Covered Entrance

- Requirement:** Main entrance of the building shall be covered with no less than 50 square feet of roof to protect entrance from rain. 1 point is available for a covered entrance; 2 points are available if there is a covered path from parking to the main entrance or a porte cochere at the main entrance.
- Points:**
- | | |
|----------|--|
| 1 point | 50 SF minimum of covered entrance |
| 2 points | 50 SF minimum covered entrance, covered path from parking to main entrance or porte cochere. |

- Intent:** Protect the building from water intrusion from rain and provide a protected path for building occupants.
- Submittals:** Provide a copy of the dimensioned plan indicating the covered entrance, the square footage of the entrance cover and photos of the entrance.
- Resources:** -

H1.05 High Efficiency Air Filtration System

- Requirement:** Design a mechanical ventilation system to include a minimum MERV 8 or 13 air filter. This credit requires the use of one filter during construction and a new filter installed pre occupancy.
- Points:** **2 points for MERV 8**
4 points for MERV 13
- Intent:** Provide improved indoor air quality.
- Submittals:** Cut sheet of air filter system.
- Resources:** -

H1.06 Chemical and Cleaning Product Storage

- Requirement:** Any room(s) containing chemicals or cleaning products for building O&M is ventilated and under negative pressure with respect to the building. The room must also have a door installed that will automatically close. For mechanically ventilated buildings, design ventilation systems that result in an air change effectiveness greater than or equal to 0.9 as determined by ASHRAE 129-1997.
- Points:** **1**
- Intent:** Provide for the effective delivery and mixing of fresh air to support the health, safety, comfort and well-being of building occupants.
- Submittals:** Letter from mechanical engineer indicating the design achieves an air change effectiveness of 0.9 or greater in each ventilated zone or that the design complies with the recommended design approaches in ASHRAE 2001 Fundamentals Chapter 32, Space Air Diffusion.
- Resources:** -

H1.07 Radon Mitigation

- Requirement:** Install a passive or active system as needed for your building location to mitigate for radon.
- Points:** **1**
- Intent:** Improve the indoor environment
- Submittals:** Construction detail and photos of installed system
- Resources:** -

H1.08 Pre Occupancy IAQ testing

- Requirement:** Perform IAQ testing over a minimum 4-hour period for a minimum of at least one (1) test per 25,000 s.f. within the breathing zone, which is between 3'0" and 6' 0" above the

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finished floor. Test and remediate building prior to occupancy using procedure consistent with the United States Environmental Protection Agency's current *Protocol for Environmental Requirements, Baseline IAQ and Materials, for the Research Triangle Park Campus, Section 01445*.

Test for the following contaminants and maximum concentration:

Contaminant	Maximum Concentration
Formaldehyde	50 parts per billion
Particulates (PM10)	50 micrograms per cubic meter
Total Volatile Organic Compounds (TVOC)	500 micrograms per cubic meter
* 4-Phenylcyclohexene (4-PCH)	6.5 micrograms per cubic meter
Carbon Monoxide (CO)	9 part per million and no greater than 2 parts per million above outdoor levels.

*This test is only required if carpets and fabrics with styrene butadiene rubber (SBR) latex backing material are installed as part of the base building systems.

Points: 1

Intent: Provide the Owner with the option to test indoor air quality prior to occupancy.

Submittals: Copy of the IAQ testing results indicating that the maximum chemical contaminant concentration requirements are not exceeded.

Resources: -

H2 Low Emitting Materials

H2.01 Adhesives and Sealants

Requirement: All Adhesives and Sealants shall be low Volatile Organic Compound (VOC) and meet the VOC limits below which were established by the South Coast Air Quality Management District (SCAQMD) Rule #1168 AND all sealants used as fillers must meet or exceed the requirements of the Bay Area Air Quality Management District Regulation 8, Rule 51.

VOC Limit, Less Water and Less Exempt Compounds in Grams per Liter

<u>Architectural Applications</u>	<u>Current VOC Limit</u>
Indoor Carpet Adhesives	50
Carpet Pad Adhesives	50
Outdoor Carpet Adhesives	150
Wood Flooring Adhesive	100
Rubber Floor Adhesives	60
Subfloor Adhesives	50

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Ceramic Tile Adhesives	65
VCT and Asphalt Tile Adhesives	50
Dry Wall and Panel Adhesives	50
Cove Base Adhesives	50
Multipurpose Construction Adhesives	70
Structural Glazing Adhesives	100
Single Ply Roof Membrane Adhesives	250

Points: 1

Intent: Improve indoor air quality by minimizing the VOC's used during the construction process.

Submittals: Contractor shall maintain all Material Safety Data Sheet (MSDS) highlighting the stated VOC emissions for each adhesive and sealant used in the building.

Resources: <http://www.arb.ca.gov/DRDB/SC/CURHTML/R1168.PDF>

H2.02 Paints & Coatings

Requirement: Paints and coatings shall have VOC less than or equal to the values listed below.

<u>Interior Coating</u>	<u>Gram / Liter</u>
Non-Flat	150
Flat	50
<u>Exterior Coating</u>	<u>Gram / Liter</u>
Non-Flat	200
Flat	100

Points: 1

Intent: Improve indoor air quality by minimizing the VOC's used during the construction process.

Submittals: Provide signed approved submittal for paints and coatings. Contractor shall maintain all Material Safety Data Sheet (MSDS) highlighting the stated VOC emissions for each adhesive and sealant used in the building.

Resources: <http://www.greenseal.org/FindGreenSealProductsandServices/Products.aspx?vid=ViewProductDetail&cid=10>

H2.03 Carpet Systems

Requirement: All carpet and carpet products shall meet the Carpet & Rug Institute Green Label Certification Program.

Points: 1

Intent: Reduce the quantity of indoor air contaminants that are odorous, potentially irritating and/or harmful to the health, comfort and well-being of installers and occupants.

Submittals: Provide signed approved submittal and photos of installed carpet

Resources: <http://www.carpet-rug.org/commercial-customers/green-building-and-the-environment/green-building-standards.cfm>

H2.04 Healthy Flooring

Requirement: 80% of a minimum of the flooring installed shall be classified as hard or resilient and comply with GreenGuard or similar health related certification.

Points: 1

Intent: Provide signed approved submittal for installed flooring and photos of final installed flooring.

Submittals: Cut sheets of flooring selections.

Resources: <http://www.greenguard.org/>

H2.05 Composite Wood and Agrifiber

Requirement: All composite wood and agrifiber products will contain no added urea-formaldehyde.

Points: 1

Intent: Reduce the quantity of indoor air contaminants that are odorous, potentially irritating and/or harmful to the health, comfort and well-being of installers and occupants.

Submittals: Provide signed approved submittal for installed products and manufacturers catalog cut sheet for each composite wood or agrifiber product used in the building indicating that the bonding agent used in each product contains no added urea-formaldehyde. Also provide photos of installed wood and agrifiber products.

Resources: -

H2.06 Insulation

Requirement: All Insulation products will be free of formaldehyde.

Points: 1

Intent: Reduce the quantity of indoor air contaminants that are odorous, potentially irritating and/or harmful to the health, comfort and well-being of installers and occupants.

Submittals: Provide signed approved submittal for insulation materials and manufacturers catalog cut sheet for each insulation product used in the building indicating that it contains no formaldehyde.

Resources: -

H2.07 Green Cleaning - Environmentally Friendly Maintenance - Green Cleaning Products in Common Areas

Requirement: Owner shall maintain or contract a cleaning service to maintain the property using only non-toxic cleaning supplies in the regular maintenance of the building. A list of approved supplies must be posted in janitor closets and in common areas such as break rooms and restrooms. Non-Toxic is defined as having a zero Health Hazard rating on the product's Material Safety Data Sheet (MSDS) and listed as "non-toxic" for Acute Toxicity under

“Section V - Health Information” on the MSDS. Alternatively, the products may be approved by the EPA's Design for Environment program or Green Seal.

Points: 2

Intent: Reduce the amount of harmful chemicals used in the maintenance operations of the building

Submittals: Provide a list of approved cleaning products for the building

Resources: <http://www.epa.gov/dfe/pubs/projects/formulat/formpart.htm>
<http://www.greenseal.org/FindGreenSealProductsandServices.aspx?vid=ViewProductDetail&cid=16>

H3 System Control

H3.01 Lighting

Requirement: A minimum of 25% of the full time occupants must be able to directly control their individual lighting either through ambient or task lighting. One additional point is available for each additional 25% of full time occupants that can control their lighting.

Points:

1 point	≥ 25% and < 50% of full time occupants can control individual lighting
2 points	≥ 50% and < 75% of full time occupants can control individual lighting
3 points	≥ 75% and < 90% of full time occupants can control individual lighting
4 points	90% of full time occupants can control individual lighting

Intent: Increase occupant comfort and productivity by providing individual control over building occupant workspaces.

Submittals: Provide the building floorplan indicating lighting controls, a narrative explaining how occupants can control their immediate environment and cut sheets of lighting selections.

Resources: -

H3.02 Thermal Comfort

Requirement: A minimum of 25% of the full time occupants must be able to directly control their temperature settings for thermal comfort. One additional point is available for each additional 25% of full time occupants that have control over their thermal comfort settings. Comply with ASHRAE Standard 55-1992, Addenda 1995, for thermal comfort standards including humidity control within established ranges per climate zone. Projects must employ both thermal and humidity control measures and systems to keep the space within the designated ranges specified by ASHRAE 55-1992.

Points:

1 point	≥ 25% & < 50% of full time occupants can control temperature settings
2 points	≥ 50% & < 75% of full time occupants can control temperature settings
3 points	≥ 75% & 90% of full time occupants can control temperature settings
4 points	90% of full time occupants can control temperature settings

Intent: Increase occupant comfort and productivity by providing individual control over building occupant workspaces.

Submittals: Provide a narrative from the mechanical engineer explaining how the project complies with ASHRAE Standard 55-1992, Addenda 1995.

Resources: -

H4 Productive Work Environment

H4.01 Daylighting

Requirement: Achieve a minimum Daylight Factor (the ratio between the measured interior and exterior light levels in lumens) of 2% for a minimum of 25% of the occupied spaces of the building. Natural light, preferably indirect, is provided via clearstories, solar tubes, light shelves or translucent panels to improve the indoor environmental quality.

*Occupied Space refers to an area occupied at least 75% of regular daytime business hours by a full or part time employee or by multiple individuals who use the same space throughout the day.

Core & Shell: Core and shell buildings with $0.3 < \text{window to wall ratio} < 0.45$ may also claim 1 daylight point.

Points:

1 point	≥ 25% and < 50% of occupied spaces achieve 2% Daylight Factor
2 points	≥ 50% and < 75% of occupied spaces achieve 2% Daylight Factor
3 points	≥ 75% and < 90% of occupied spaces achieve 2% Daylight Factor
4 points	90% of occupied spaces achieve 2% Daylight Factor

Intent: Increase occupant comfort and productivity by providing natural light to the building occupant workspaces.

Submittals: Provide plans specifying the daylit areas and daylighting calculations for occupied spaces. For core and shell buildings, provide the window to wall ratio calculations.

Resources: -

H4.02 Acoustics

Requirement: Earn one point for each assembly, exterior, interior, and fenestration that complies with the sound transmission coefficient (STC) ratings listed.

Exterior wall and Roof assembly have STC rating ≥ 50
Fenestration STC rating ≥ 30
Interior spaces: Private adjacent to private STC ≥ 45
Interior spaces: Private adjacent to public/common space STC ≥ 55

Points:

1 point	1 assembly
2 points	2 assemblies
3 points	3 assemblies
4 points	4 assemblies

Intent: Increase occupant comfort and productivity by providing appropriate acoustical control for the building occupants.

Submittals: Provide cut sheets for the wall assembly and fenestration indicating the STC ratings.

Resources: -

H4.03 Views

Requirement: To comply with this credit, a minimum of 25% of the full time occupants must have line of sight from their work station to the exterior. Earn one point for each 25% of the full time occupants that have line of site to the exterior.

Points:

1 point	≥ 25% and < 50% of full time occupants have line of sight to exterior
2 points	≥ 50% and < 75% of full time occupants have line of sight to exterior
3 points	≥ 75% and < 90% of full time occupants have line of sight to exterior
4 points	90% of full time occupants have line of sight to exterior

Core & Shell: Core and shell buildings with $0.3 < \text{window to wall ratio} < 0.45$ may also claim 1 daylight point.

Intent: Increase occupant comfort and productivity by providing line of site to the outdoors.

Submittals: Provide a furniture plan of the building; indicate the location of building occupants and their line of site to the outdoors. For core and shell buildings, provide the window to wall ratio calculations.

Resources: -

H4.04 Outdoor Space Provided for Employees

Requirement: Provide a covered and or screened area outdoors for employee meetings or lunch breaks. To receive credit, this space must be designated non-smoking and be a minimum of 250 SF.

Points: 1

Intent: Increase occupant productivity by covered outdoor space for lunch, breaks, and meetings.

Submittals: Provide a site plan indicating outdoor space, type of cover, square footage and photos.

Resources: -

CATEGORY 6: MATERIALS

M Prerequisite 1: Storage & Collection of Recyclables

Requirement: Provide an accessible area (sized based on building use, operations and building size) that serves the entire building and is dedicated to the separation, collection and storage of materials for recycling including (at a minimum) paper, corrugated cardboard, glass, plastics and metals. If fluorescent or High Intensity Discharge (HID) lighting is specified and used on the project, space should be allocated in the recycling room for storage and proper disposal of light bulbs.

Points: **Prerequisite - Required**

Intent: Facilitate the reduction of waste generated by building occupants that is hauled to and disposed of in landfills.

Submittals: Floor plan indicating recycling room and photo of space provided in the building.

Resources: -

M1 Material Efficiency and Global Responsibility

M1.01 Remodel Existing Building

Requirement: Rehabilitate existing building.

Maintain 100% total of existing building structure and shell (exterior skin and framing, excluding window assemblies) and non-structural roofing material.

Points: **10**

Intent: Renovate existing building stock to conserve resources, retain cultural resources, reduce waste and reduce environmental impacts of new buildings as they relate to materials manufacturing and transport.

Submittals: Floor plan of existing building, demolition plan, and new building floor plan.

Resources: -

M1.02 Recycled Content

Requirement: Incorporate recycled materials (based on materials cost). Use materials with recycled content such that post-consumer and/or post-industrial recycled content constitutes a minimum of 5% of the total project cost. Earn one additional point for each additional 5% of recycled content materials. The value of the recycled content portion of a material or furnishing shall be determined by dividing the weight of recycled content in the item by the total weight of all material in the item, then multiplying the resulting percentage by the total value of the item.

Mechanical and electrical components shall not be included in this calculation. Recycled content materials shall be defined in accordance with the Federal Trade Commission document, Guide for the Use of Environmental Marketing Claims, 15 CFR 260.7 (e), available at www.ftc.gov/bcp/grnrule/guides980427.htm.

Points:

1 point	≥ 5% and < 10% recycled content
2 points	≥ 10% and < 15% recycled content
3 points	≥ 15% and < 20% recycled content

4 points ≥ 20% recycled content

Intent: Encourage the use of recycled content materials to minimize the environmental impacts associated with the extraction of virgin materials.

Submittals: Submit the completed materials checklist and supporting documentation of the percentages claimed including budget documentation.

Resources: -

M1.03 Rapidly Renewable Materials

Requirement: Incorporate rapidly renewable (plant to harvest cycle <10 years) for 3% of the total value of all building materials and products used in the project. Earn one additional point for each 2% of additional rapidly renewable materials such as bamboo flooring, wool carpets, straw board, cotton batt insulation, linoleum flooring, poplar OSB, and sunflower seed board and wheatgrass cabinetry qualify for this credit.

Points: **1 point ≥ 3% and < 5% rapidly renewable materials**
 2 points ≥ 5% and < 7% rapidly renewable materials
 3 points ≥ 7% rapidly renewable materials

Intent: Reduce the use and depletion of finite raw materials and long-cycle renewable materials by replacing them with rapidly renewable materials.

Submittals: Submit calculations demonstrating that the project incorporates the required percentage of rapidly renewable products used in the construction of the project. Submit the completed materials checklist and supporting documentation of the percentages claimed including budget documentation.

Resources: -

M1.04 Certified Wood

Requirement: Wood products are FSC, SFI or CSA certified. Use a minimum of 50% certified of wood-based materials and products, for wood building components including, but not limited to, structural framing and general dimensional framing, flooring, finishes, furnishings and non-rented temporary construction applications such as bracing, concrete form work and pedestrian barriers. Earn one additional point for each 25% additional certified wood used on the project.

Points: **1 point ≥ 40% and < 60% of certified wood**
 2 points ≥ 60% and < 80% of certified wood
 3 points 80% of certified wood

Intent: Encourage environmentally responsible forest management.

Submittals: Submit a copy of the wood certification and the calculations showing percentage of certified wood used in the construction of the project. Submit the completed materials checklist and supporting documentation of the percentages claimed including budget documentation.

Resources: -

M1.05 Biobased Materials

Requirement: Earn one point if 5% of the materials, based on cost, that are bio based such as solid wood, engineered wood, bamboo, wool, cotton, cork, agricultural fibers, or other bio based materials with at least 50% bio based content.

Points: 1

Intent: Encourage the use of natural products.

Submittals: Cut sheets of materials used and the calculations showing percentage of bio based materials used in the construction of the project. Submit the completed materials checklist and supporting documentation of the percentages claimed including budget documentation.

Resources: -

M2 Waste Management

M2.01 Construction Waste Recycling

Requirement: Develop and implement a waste management plan, quantifying material diversion goals. Recycle and/or salvage a minimum of 50% of construction, demolition and land clearing waste. Calculations can be done by weight or volume but must be consistent throughout. Earn additional points for increased diversion of waste.

Points: 2 point: $\geq 50\% < 75\%$
3 points: $> 75\% < 90\%$
4 points: $> 90\%$

Intent: Divert construction, demolition and land clearing debris from landfill disposal. Redirect recyclable recovered resources back to the manufacturing process. Redirect reusable materials to appropriate sites.

Submittals: Provide copies of the monthly waste reports indicating diverted waste and calculate the total waste material diversion rate

Resources: -

M2.02 Leased Floor Coverings

Requirement: Demonstrate that a minimum of 50% of the floor coverings utilized on the project are being leased from the manufacture and that once the floor coverings are no longer wanted, the manufacture will reclaim the floor coverings for recycling and materials reuse.

Points: 1

Intent: To increase the reclamation and recycling of one of the largest volumes of landfill materials.

Submittals: Provide a copy of the contract that highlights the terms of the purchase / lease of floor coverings that will be taken back by the manufacturer for recycling rather than disposal in landfill

Resources: -

M2.03 Recyclable Materials

Requirement: Use materials that at the end of their useful lifecycle can be recycled by the manufacturer into the raw materials stream of another product. The value of such products will constitute a minimum of 10% of the total value of the materials in the project. The materials selected to comply with this category must be recyclable through a structured existing program.

Points: 1

Intent: Increase the demand for materials that are recyclable at the end of their useful life cycle.

Submittals: Provide cut sheets for the products calculated as a part of this credit and information about the existing recycling facilities. This credit may also be claimed if the area has an established C&D waste recycling infrastructure.

Resources: -

M2.04 Demountable / Adaptable Interiors

Requirement: A minimum of 50% of the linear feet (LF) of interior wall partitions must be constructed from demountable / adaptable partitions.

Points: 1

Intent: Reduce the amount of waste generated over the life of the building as a result of churn and remodeling.

Submittals: Provide a floor plan indicating the location of the demountable wall partitions, a calculation of the total LF of partition walls and a calculation of the total LF of demountable walls. Also provide a cut sheet and photos of the installed wall systems used.

Resources: -

M2.05 Durable Materials, Exterior Finish Materials

Requirement: Use finishes systems and materials capable of withstanding the moisture and heat impacts of the local climate for a period of 30 years on 100% of the exposed exterior surfaces. Exterior surface products must have a minimum of a 30 year warranty.

Points: 1

Intent: Improve the durability of the building envelope and reduce the need to replace existing structural finish components and materials over the expected lifetime of the building.

Submittals: Provide plan details identifying the exterior materials, approved submittals and corresponding 30-year warranties for all materials that are 100% exposed.

Resources: -

M2.06 Low Maintenance Finishes

Requirement: Use interior and exterior finish materials that require minimal or no periodic cleaning. Use materials (on the floors, walls and ceilings) that can be maintained in a serviceable condition with minimal periodic cleaning for 100% of the interior finishes and 50% (by surface area) of the exterior finishes of the building.

- Points:** 1
- Intent:** Reduce the need for harsh maintenance chemicals thereby reducing the source pollution within and around the building and improving the indoor air quality.
- Submittals:** Provide copies of the manufacturer’s recommended maintenance procedures for the interior and exterior finishes.
- Resources:** -

M3 Local/Regional Materials

M3.01 Local Manufacturing

Requirement: Earn one point by using a minimum of 25% (by cost) based on project cost (div 2-10) of building materials and products that are manufactured* within a 700 mile radius of the project site. Earn one additional point for each additional 25% of materials that are manufactured within 700 miles of the project site.

*Manufacturing refers to the final assembly of components into the building product that is furnished and installed by the tradesman. For example, if the hardware comes from Dallas, Texas, the lumber from Vancouver, British Columbia and the truss is assembled in Kent, Washington; then the location of the final assembly is Kent, Washington.

- Points:**
- 1 point:** ≥ 10% < 15% of building materials manufactured within 700 mile radius
 - 2 points** > 15% and <20% of building materials manufactured within 700 mile radius
 - 3 points** > 20% and < 25% of building materials manufactured within 700-mile radius
 - 4 points** > 25% of building materials manufactured within 700-mile radius

Intent: Increase demands for building materials and products that are extracted and manufactured within the region, thereby reducing the environmental impacts resulting from transportation and supporting the regional economy.

Submittals: Submit the completed materials checklist and supporting documentation of the percentages claimed including budget documentation.

Resources: -

M3.02 Local Raw Materials Extraction

Requirement: A minimum of 10% of the project materials are made from raw materials that are harvested, extracted, or recovered within a 700-mile radius from project site. Earn additional points for each additional 10% of the project materials that are extracted within 700 miles of project site.

- Points:**
- 1 point** ≥ 5% and < 10% harvested, extracted or recovered within 700-mile radius
 - 2 points** > 10% and < 15% harvested, extracted or recovered within 700-mile radius
 - 3 points** > 15% and < 20% harvested, extracted or recovered within 700-mile radius
 - 3 points** > 20% harvested, extracted or recovered within 700-mile radius

Intent: Reduce the use of virgin materials.

Submittals: Submit the completed materials checklist and supporting documentation of the percentages claimed including budget documentation.

Resources: -

M3.03 Resource Reuse

Requirement: Use salvaged, refurbished or reused materials, products and furnishings for at least 5% of building materials (based on cost) to earn one point. An additional point may be earned by reusing 10% of materials.

Points: **1 point** **≥ 5% and < 10% of salvaged, refurbished or reused**
 2 points **≥ 10% of salvaged, refurbished or reused**

Intent: Reuse building materials and products in order to reduce demand for virgin materials and to reduce waste thereby reducing impacts associated with the extraction and processing of virgin resources.

Submittals: Submit the completed materials checklist and supporting documentation of the percentages claimed including budget documentation.

Resources: -

CATEGORY 7: DISASTER MITIGATION

DM1 Hurricane Resistance

DM1.01 Impact Glazing

Requirement: ALL installed glazing is impact resistant.

Points: 3

Intent: Increase the structural integrity of the building during high wind conditions, reducing the potential for damage, thus decreasing the potential waste and need for replacement materials after the storm.

Submittals: Provide the manufacturer's cut sheets for the impact resistant products indicating the required approvals and classifications. Photos of the window stickers and or shop drawings may also be provided.

Resources: www.buildingcodeonline.com or <http://hus.parkingspa.com/hc3.asp>

DM1.02 Building Integrated Hurricane Shutters

Requirement: Building is equipped with solid, integrated Miami Dade approved hurricane shutters. Shutters that rain can penetrate or shutters that must be manually installed do not qualify for this credit.

Points: 3

Intent: Improve the durability of the structure against high winds, driving rain conditions, and atmospheric pressurization; thereby reducing the potential for interior damage, and decreasing the potential waste and need for replacement after a storm.

Submittals: Signed approved submittal and photos of installed shutters.

Resources: www.buildingcodeonline.com or <http://hus.parkingspa.com/hc3.asp>

DM1.03 Building Hardening

Requirement: Building is engineered to withstand design pressures that are 20 mph greater than the code requirements for the area.

Points: 2

Intent: Increase the hurricane resistance of the building.

Submittals: Design calculations and a narrative from the architect or structural engineer explaining measures taken to improve the buildings resistance to hurricanes.

Resources: -

DM1.04 Uninterrupted Operations

Requirement: The building through use of renewable energy or generators must be able to continue operations during times of extended grid source power loss. The power back-up system must be designed to provide a minimum 8 hours of operation per day for 3 days.

Points: 3

Intent: Allow businesses to run and service the community after storm events.
Submittals: Approved submittal and photos of installed system
Resources: -

DM1.05 Building is Designated a Hurricane Shelter

Requirement: The building is designed to meet or exceed the requirements for Florida hurricane shelters. Requirements may vary based on local jurisdiction and wind loads. The credits are only available if the building complies with the Hurricane Shelter requirements of the location.

Points: 5

Intent: Provide a durable building that can also service the community.

Submittals: A brief narrative describing the features added to comply with the local hurricane shelter requirements.

Resources: Florida Disaster Hurricane Shelters and Critical Facilities Library
<http://www.floridadisaster.org/Response/engineers/library.htm>
Standards for Hurricane Evacuation Shelter Selection
<http://www.floridadisaster.org/Response/engineers/SESPlans/2010SESPPlan/documents/2010-SESP-AppxCfinal.pdf>
Performance Standards and Expectations of Hurricane Shelters
http://www.floridadisaster.org/Response/engineers/documents/06_GHC-PerfStds-of-Shelters.pdf
ICC/NSSA Storm Shelter Standard (Draft)
<http://www.floridadisaster.org/Response/engineers/documents/2006%20GHC%20ICC%20Tezak.pdf>

2017 Florida Building Code—Building, 6th Edition Section 453.25 Public Shelter Design Criteria

https://www.floridadisaster.org/globalassets/dem/response/sesp/2018/appendices/2018-sesp-appendix-b_abc-text_final_1-29-18.pdf

DM2 Pest Management

DM2.01 Termite Prevention

Requirement: The building uses an alternative to traditional soil poison for termite treatment. Systems may include the use of borate or Alkaline Copper Quaternary (ACQ) treated lumber or termite bait systems. To achieve this credit any and all plants, turf and irrigation lines must be a minimum of 3' from the foundation. Additionally, any foam insulation must terminate above ground. The exterior cladding of the building must also terminate a least 8" above grade. Rainwater from the roof must also be dispersed a minimum of 3' from the building foundation (by the use of downspouts or scuppers and extensions or splashblocks). All AC condensate lines must also discharge a minimum of 3' from the building.

Points: 3

Intent: Increase the termite resistance of the building, reducing the potential for damage from termite infestation, thus decreasing the potential waste and need for replacement materials after the damage is detected.

Submittals: Provide appropriate drawings and specifications, illustrating compliance to all requirements.

Resources: -

DM2.02 Physical Termite Barrier

Requirement: Physical barriers must be used in addition to or in lieu of traditional termite treatments. Physical barriers include stainless steel mesh, elastomeric plumbing boots, or other means of physically sealing the slab penetrations.

Points: 3

Intent: Increase the termite resistance of the building, reducing the potential for damage from termite infestation, thus decreasing the potential waste and need for replacement materials after the damage is detected.

Submittals: Provide photos showing all sealed penetrations.

Resources: -

DM2.03 Integrated Pest Management

Requirement: Work with a skilled pest control professional to develop an Integrated Pest Management Plan that addresses the following four items:

- Monitoring and prevention of pest populations.
- Application of pesticides only “as needed” after prevention and physical controls have been implemented.
- Selecting the least hazardous pesticides for control of targeted pests.
- Precision targeting of pesticides to areas not contacted or accessible to the occupants.

Points: 3

Intent: Integrated pest management (IPM) is a process for achieving long term, environmentally sound pest suppression through the use of a wide variety of technological and management practices. Control strategies in an IPM program extend beyond the application of pesticides to include structural and procedural modifications that reduce the food, water, harborage, and access used by pests. IPM can reduce the use of chemicals and provide economical and effective pest suppression. IPM does not involve the complete elimination of the use of pesticides, nor does it involve solely substituting “good” pesticides for “bad” pesticides. IPM attempts to achieve a balance of both chemical and non-chemical methods to control pest problems. Integrated pest management (IPM) can reduce or eliminate the need for chemicals to control pests inside and outside of the building.

To properly implement IPM, there are maintenance issues that need to be undertaken by the Owner after construction, therefore an IPM maintenance plan should be developed and included in an Owner’s manual that is presented to the Owner.

Submittals: IPM plan

Resources: An excellent source of information on IPM is the Sustainable Building Sourcebook by Austin Energy, Austin, TX. It can be found on the internet at <http://nontoxictermite.sustainablesources.com/> Another source of information is “Integrated Pest Management for Schools: A Catalog of Resources”, put together by the University of Florida Institute of Food and Agricultural Sciences, and available at: http://schoolipm.ifas.ufl.edu/school_ipm.pdf .

DM3 Flood

DM3.01 Finished Floor Elevation (FFE)

Requirement: FFE must be 12" above 100-year flood plain or finished grade adjacent to building, whichever is higher. All grades around building must slope away from the foundation a minimum of 6" at 10'-0" distance. The 100-year flood plain is determined by FEMA.

Points: 2

Intent: Reduce the potential for flooding and the resulting moisture and mildew problems.

Submittals: Provide the appropriate drawings illustrating the foundation design, floor elevation and grading requirements. Include a copy of the NFIP Elevation Certificate certified by the surveyor, engineer or architect showing the 100-year flood plain elevation or grade.

Resources: -

DM3.02 All mechanical equipment pads

Requirement: All mechanical equipment pads must be 12" above 100-year flood plain or grade, whichever is higher. All grades around building must slope away from the foundation a minimum of 6" at 10'-0" distance. The 100-year flood plain is determined by FEMA.

Points: 2

Intent: Increase the longevity of equipment by providing a buffer from flood events.

Submittals: Provide the appropriate drawings illustrating the foundation design, floor elevation and grading requirements. Include a copy of the NFIP Elevation Certificate certified by the surveyor, engineer or architect showing the 100-year flood plain elevation or grade.

Resources: -

DM3.03 Buildings within 1 Mile of the Coast

Requirement: For building within 1 mile of the coast, or seaward of the Coastal Construction Control Line the FFE and equipment elevations are 24" above 100-year flood plain.

Points: 2

Intent: Increase the longevity of equipment by providing a buffer from flood events.

Submittals: Provide the appropriate drawings illustrating the building proximity to the coast and the elevations of the FFE and equipment slabs. Include a copy of the NFIP Elevation Certificate certified by the surveyor, engineer or architect.

Resources: -

DM4 Fire Resistant Exterior Finishes

Requirement: Project must utilize fire-resistant exterior wall cladding, roof covering or sub-roof, soffit and vent materials. An exterior cladding other than wood or vinyl must be used on all

exterior walls. A roof covering other than asphalt shingles or wood shakes must be used on the entire roof. Roof covering fire resistance shall exceed Code requirements by a minimum of one classification (for example, install Class “A” when Code requires Class “B”). Soffit and vent materials must be other than wood or vinyl. When these parts of the building are compromised, embers from nearby fires can enter into the attic.

Strategies: Use exterior wall materials made of stucco, unfinished CBS, brick, aluminum, stone or fiber-cement. Use roof coverings made of metal, concrete, fiber-cement, or tile. Use soffit and vent materials made of aluminum or fiber-cement.

Points: 2

Intent: Increase the fire resistance of the building, reducing the potential for damage from wildfires, thus decreasing the potential waste and need for replacement materials after the fire.

Submittals: Provide the completed Letter Template, signed by the architect or other responsible party, and appropriate drawings and manufacturer’s cut sheets illustrating the fire resistance of the exterior finish materials.

Resources: -

CATEGORY 8: ENVIRONMENTAL INNOVATION

EI Environmental Innovation

Requirement: Up to five points are available for innovative and environmentally beneficial regionally specific additions to the project.

Points: 1-5

Intent: These credits are intended to provide the design teams and projects the opportunity to be awarded points for exceptional performance above the requirements set by the Florida Green Building Coalition and/or innovative performance in Green Building categories not specifically addressed by this standard

Submittals: The submittals will be determined based on the innovation request.

Resources: -