
GETTING MORE FROM
GREEN BUILDING DESIGN

OBJECTIVES

DEFINE SUSTAINABILITY AND ITS IMPORTANCE TO THE BUILT ENVIRONMENT

REVIEW THE PROCESS OF HIGH-PERFORMANCE DESIGN

LOOK AT THE TOOLS AVAILABLE TO OWNERS WHO WANT TO TAILOR THE DESIGN PROCESS TO THEIR COMPANY'S BRAND, EXPECTATIONS, AND GOALS

QUANTIFY THE ASSESSMENT AND CERTIFICATION PROCESS, AND HOW THEY RELATE TO CONSTRUCTION, CONTRACTS, AND OPERATIONS.

DISCUSS RELATIVE COSTS, FEES, AND RETURN ON INVESTMENT

SUSTAINABILITY

consumption

emissions

impact

waste

} OPTIMIZING

SUSTAINABILITY

consumption

emissions

impact

waste

} **OPTIMIZING**

PRIMARY FOCUS

- policies, practices, and operations
- site selection and design
- water efficiency
- energy and atmosphere
- materials and resources
- indoor environmental quality
- innovation

SUSTAINABILITY

consumption

emissions

impact

waste

} OPTIMIZING

GOALS

cost optimization

positive impact on health

less waste, smaller impact

identity and branding

SUSTAINABILITY

consumption

emissions

impact

waste

} OPTIMIZING

BRANDING

Maryland-District of Columbia Utilities Association

Increase the effectiveness of utility services

Provide increased value to our customers

[SUSTAINABILITY]

consumption

emissions

impact

waste

} OPTIMIZING

BRANDING

The New York Times

ENERGY & ENVIRONMENT

Dutch Utility Bets Its Future on an Unusual Strategy: Selling Less Power

By STANLEY REED AUG. 18, 2017

A wind farm close to Almere, the Netherlands. Eneco has invested heavily in wind power, in part so that it can assure environmentally minded customers that their power comes from cleaner sources. Jiro Mochizuki for The New York Times


PROCESS
Gather
Motivate
STAKEHOLDERS
Quantify
Plan
BASIS
Implement
Review
APPLICATION

PROCESS

Gather
Motivate

STAKEHOLDERS

Quantify
Plan

BASIS

Implement
Review

APPLICATION

MASTERPLAN

↓

BASIS OF DESIGN

↓

PROFESSIONAL SERVICES AGREEMENT

↓

ASSESSMENTS

PROCESS | MASTERPLAN

MASTERPLANNING

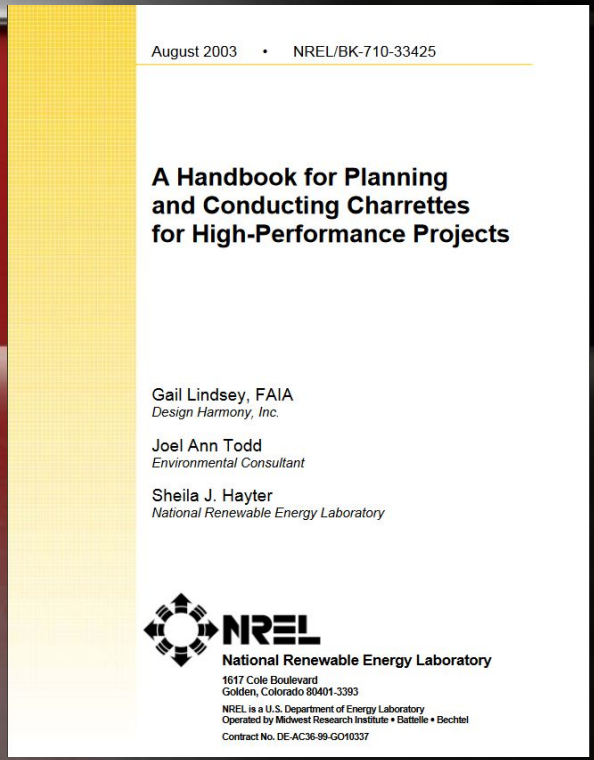
THE PROCESS OF PLANNING FOR THE FUTURE BY DEFINING A FRAMEWORK, VISION, AND STRATEGY.

CHARRETTE

THE PLANNING SESSION(S) WHERE PROJECT STAKEHOLDERS SUBMIT AND VET IDEAS AND GOALS

BASIS OF DESIGN

THE PUBLISHED RESULT OF MASTERPLANNING



August 2003 • NREL/BK-710-33425

A Handbook for Planning and Conducting Charrettes for High-Performance Projects

Gail Lindsey, FAIA
Design Harmony, Inc.

Joel Ann Todd
Environmental Consultant

Sheila J. Hayter
National Renewable Energy Laboratory

NREL
National Renewable Energy Laboratory
1617 Cole Boulevard
Golden, Colorado 80401-3393
NREL is a U.S. Department of Energy Laboratory
Operated by Midwest Research Institute • Battelle • Bechtel
Contract No. DE-AC36-99-GO10337

PROCESS | MASTERPLAN

Gather
Motivate

STAKEHOLDERS

Quantify
Plan

BASIS

Implement
Review

APPLICATION

IDENTITY

Stakeholder Committee
Individuals that will guide the charrette planning process and ensure support from key individuals and organizations

Variety
Ideally, the steering committee represents a variety of interests: Business Leadership; Community; Operations; Management.

Open and organized
Thought-provoking, accepting, and encouraging new ideas in an organized and productive manner

Energized
Optimistic individuals, focused on publicly delivering the results of the planning process to interested individuals.

PROCESS | CHARRETTE

Gather

Motivate

STAKEHOLDERS

Quantify

Plan

BASIS

Implement

Review

APPLICATION

PROCESS | CHARRETTE

Gather
Motivate
} STAKEHOLDERS

Quantify
Plan
} BASIS

Implement
Review
} APPLICATION

CHARRETTE

PROCESS
An intense planning session intended to build consensus, develop design goals, and define motivations for a project.

PROCESS | CHARRETTE

Gather
Motivate
} STAKEHOLDERS

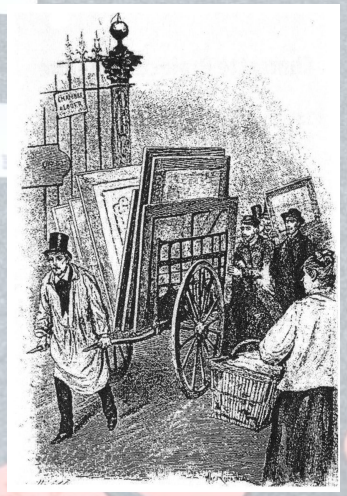
Quantify
Plan
} BASIS

Implement
Review
} APPLICATION

CHARRETTE

CONTEXT

The cart sent to retrieve the final architecture projects of the students of l'Ecole des Beaux Arts in Paris.



PROCESS | CHARRETTE

Gather
Motivate
} STAKEHOLDERS

Quantify
Plan
} BASIS

Implement
Review
} APPLICATION

CHARRETTE

PRE-REQUISITES

- Defined program
- Narrow focus: site, scope, options
- Available resources
- Leadership
- Pre-defined limits, focus, and intent

PROCESS | BASIS OF DESIGN

Gather
Motivate
} STAKEHOLDERS

Quantify
Plan
} BASIS

Implement
Review
} APPLICATION

BASIS OF DESIGN
Function | **Performance** | Maintenance

Function
Establishes project requirements, technical approach, and design parameters.

Performance
Defined criteria for decision-making.

Maintenance
Establishes regular reviews to gauge performance, re-assess priorities, and ensure performance goals are maintained.

PROCESS | BASIS OF DESIGN

Gather

Motivate

} STAKEHOLDERS

Quantify

Plan

} BASIS

Implement

Review

} APPLICATION

BASIS OF DESIGN

Function | **Performance** | Maintenance

- Energy Performance
- Protection and Restoration of Habitat
- Collection and Storage of Recyclables
- Site Selection
- Daylighting and Views
- Indoor Chemical and Pollutant Source Control
- Design Innovation

PROCESS | BASIS OF DESIGN

RESEARCH

SELECTION

COORDINATION

SPECIFICATION

DESIGN

ADMINISTRATION

BASIC

PREPARATION

ASSESSMENT

VERIFICATION

ENHANCED

BASIS OF DESIGN

Function | **Performance** | Maintenance

- Energy Performance
- Protection and Restoration of Habitat
- Collection and Storage of Recyclables
- Site Selection
- Daylighting and Views
- Indoor Chemical and Pollutant Source Control
- Design Innovation

PROCESS | AGREEMENT

RESEARCH

SELECTION

COORDINATION

SPECIFICATION

DESIGN

ADMINISTRATION

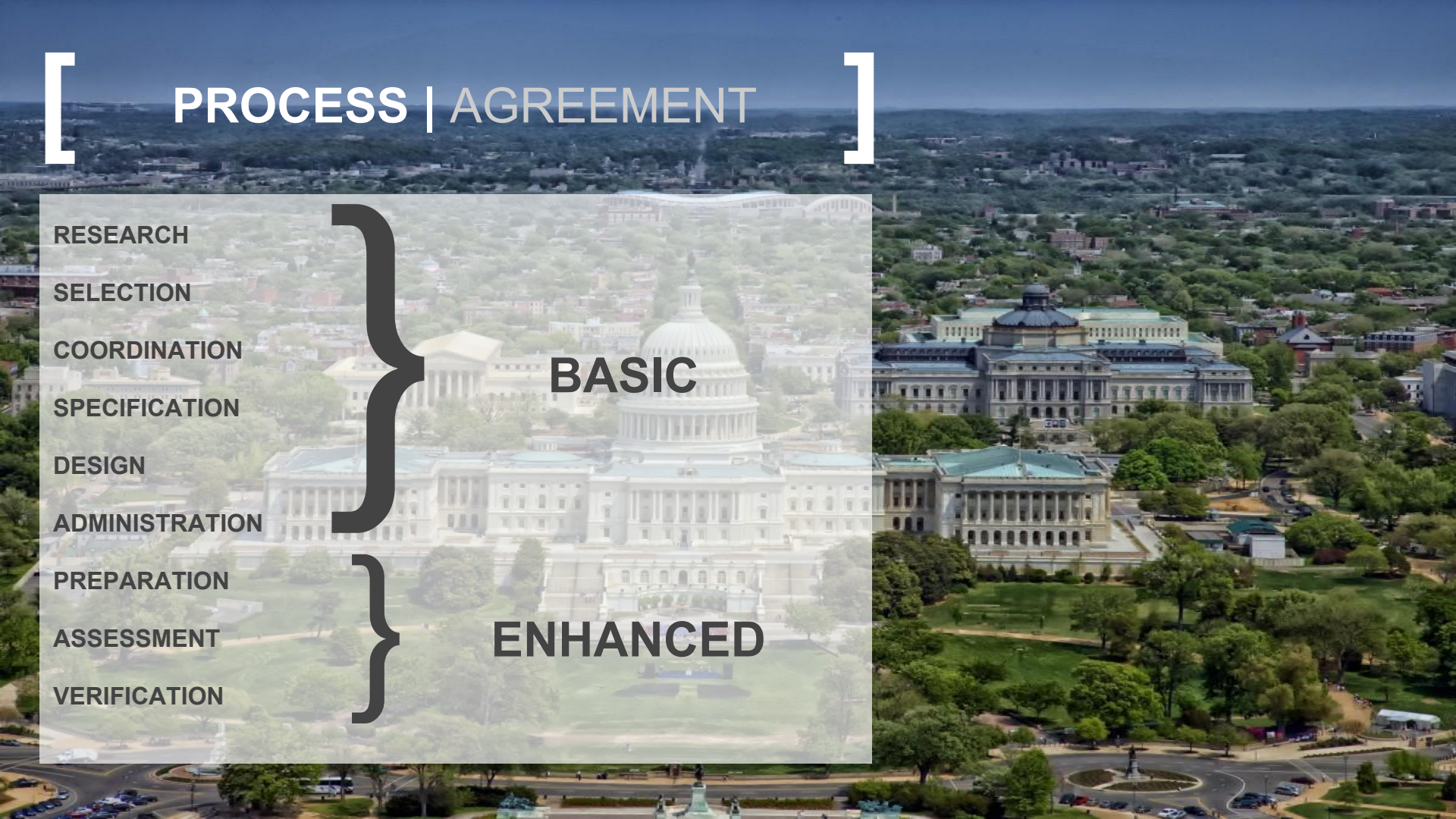
BASIC

PREPARATION

ASSESSMENT

VERIFICATION

ENHANCED



PROCESS | AGREEMENT

RESEARCH

SELECTION

COORDINATION

SPECIFICATION

DESIGN

ADMINISTRATION

BASIC

PREPARATION

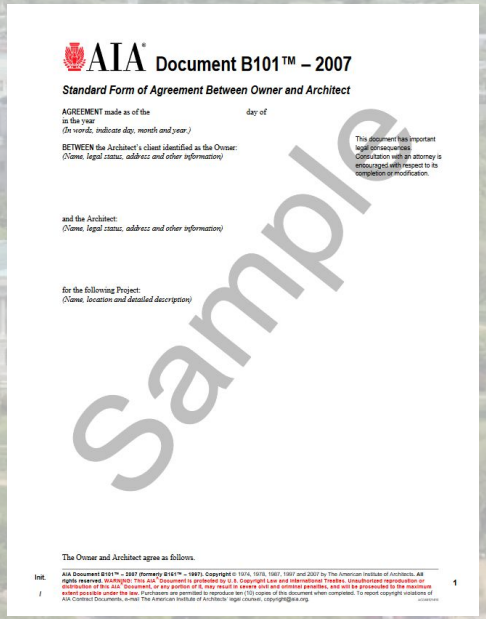
ASSESSMENT

VERIFICATION

ENHANCED

BASIS OF DESIGN

Function | **Performance** | Maintenance



AIA Document B101™ – 2007

Standard Form of Agreement Between Owner and Architect

AGREEMENT made as of the day of
in the year
(In words, indicate day, month and year.)

BETWEEN the Architect's client identified as the Owner:
(Name, legal status, address and other information)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

and the Architect:
(Name, legal status, address and other information)

for the following Project:
(Name, location and detailed description)

Sample

The Owner and Architect agree as follows.

Init.

1

1

PROCESS | AGREEMENT

RESEARCH

SELECTION

COORDINATION

SPECIFICATION

DESIGN

ADMINISTRATION

} BASIC

PREPARATION

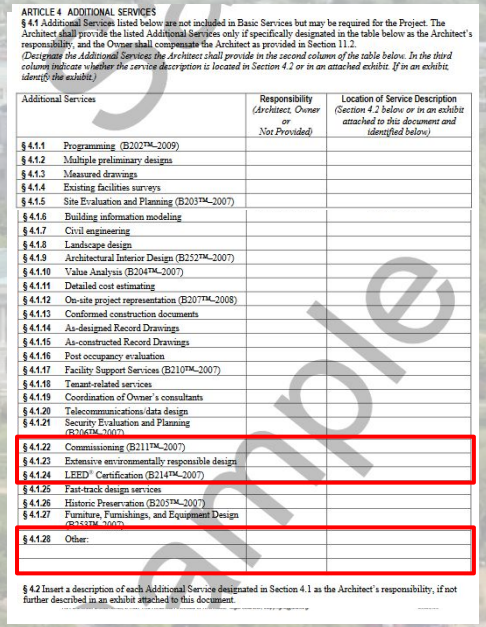
ASSESSMENT

VERIFICATION

} ENHANCED

BASIS OF DESIGN

Function | **Performance** | Maintenance



ARTICLE 4 ADDITIONAL SERVICES

§ 4.1 Additional Services listed below are not included in Basic Services but may be required for the Project. The Architect shall provide the listed Additional Services only if specifically designated in the table below as the Architect's responsibility, and the Owner shall compensate the Architect as provided in Section 11.2.

(Designate the Additional Services the Architect shall provide in the second column of the table below. In the third column indicate whether the service description is located in Section 4.2 or in an attached exhibit. If in an exhibit, identify the exhibit.)

Additional Services	Responsibility (Architect, Owner or Not Provided)	Location of Service Description (Section 4.2 below or in an exhibit attached to this document and identified below)
§ 4.1.1 Programming (B202™–2009)		
§ 4.1.2 Multiple preliminary designs		
§ 4.1.3 Measured drawings		
§ 4.1.4 Existing facilities surveys		
§ 4.1.5 Site Evaluation and Planning (B203™–2007)		
§ 4.1.6 Building information modeling		
§ 4.1.7 Civil engineering		
§ 4.1.8 Landscape design		
§ 4.1.9 Architectural Interior Design (B252™–2007)		
§ 4.1.10 Value Analysis (B204™–2007)		
§ 4.1.11 Detailed cost estimating		
§ 4.1.12 On-site project representation (B207™–2008)		
§ 4.1.13 Conformed construction documents		
§ 4.1.14 As-designed Record Drawings		
§ 4.1.15 As-constructed Record Drawings		
§ 4.1.16 Post occupancy evaluation		
§ 4.1.17 Facility Support Services (B210™–2007)		
§ 4.1.18 Tenant-related services		
§ 4.1.19 Coordination of Owner's consultants		
§ 4.1.20 Telecommunications/data design		
§ 4.1.21 Security Evaluation and Planning (B206™–2007)		
§ 4.1.22 Commissioning (B211™–2007)		
§ 4.1.23 Extensive environmentally responsible design		
§ 4.1.24 LEED® Certification (B214™–2007)		
§ 4.1.25 Fast-track design services		
§ 4.1.26 Historic Preservation (B205™–2007)		
§ 4.1.27 Furniture, Furnishings, and Equipment Design (B253™–2007)		
§ 4.1.28 Other:		

§ 4.2 Insert a description of each Additional Service designated in Section 4.1 as the Architect's responsibility, if not further described in an exhibit attached to this document.

PROCESS | AGREEMENT

RESEARCH

SELECTION

COORDINATION

SPECIFICATION

DESIGN

ADMINISTRATION

BASIC

PREPARATION

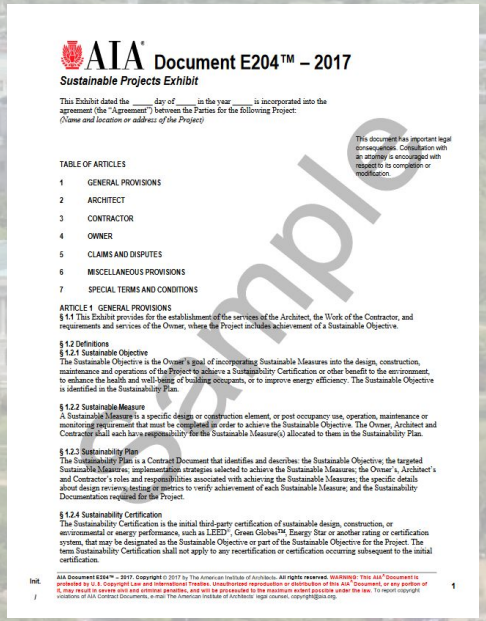
ASSESSMENT

VERIFICATION

ENHANCED

BASIS OF DESIGN

Function | **Performance** | Maintenance



AIA Document E204™ – 2017

Sustainable Projects Exhibit

This Exhibit dated the _____ day of _____ in the year _____ is incorporated into the agreement (the "Agreement") between the Parties for the following Project:
(Name and location or address of the Project)

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

TABLE OF ARTICLES

1 GENERAL PROVISIONS
2 ARCHITECT
3 CONTRACTOR
4 OWNER
5 CLAIMS AND DISPUTES
6 MISCELLANEOUS PROVISIONS
7 SPECIAL TERMS AND CONDITIONS

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 This Exhibit provides for the establishment of the services of the Architect, the Work of the Contractor, and requirements and services of the Owner, where the Project includes achievement of a Sustainable Objective.

§ 1.2 Definitions

§ 1.2.1 Sustainable Objective

The Sustainable Objective is the Owner's goal of incorporating Sustainable Measures into the design, construction, maintenance and operations of the Project to achieve a Sustainability Certification or other benefit to the environment, to enhance the health and well-being of building occupants, or to improve energy efficiency. The Sustainable Objective is identified in the Sustainability Plan.

§ 1.2.2 Sustainable Measure

A Sustainable Measure is a specific design or construction element, or post occupancy use, operation, maintenance or monitoring requirement that must be completed in order to achieve the Sustainable Objective. The Owner, Architect and Contractor shall each have responsibility for the Sustainable Measure(s) allocated to them in the Sustainability Plan.

§ 1.2.3 Sustainability Plan

The Sustainability Plan is a Contract Document that identifies and describes: the Sustainable Objective; the targeted Sustainable Measures; implementation strategies selected to achieve the Sustainable Measures; the Owner's, Architect's and Contractor's roles and responsibilities associated with achieving the Sustainable Measures; the specific details about design reviews, testing or metrics to verify achievement of each Sustainable Measure; and the Sustainability Documentation required for the Project.

§ 1.2.4 Sustainability Certification

The Sustainability Certification is the initial third-party certification of sustainable design, construction, or environmental or energy performance, such as LEED®, Green Globes™, Energy Star or another rating or certification system, that may be designated as the Sustainable Objective or part of the Sustainable Objective for the Project. The term Sustainability Certification shall not apply to any recertification or certification occurring subsequent to the initial certification.

PROCESS | AGREEMENT

RESEARCH

SELECTION

COORDINATION

SPECIFICATION

DESIGN

ADMINISTRATION

BASIC

PREPARATION

ASSESSMENT

VERIFICATION

ENHANCED

BASIS OF DESIGN

Function | **Performance** | Maintenance

AIA E204-2017
SUSTAINABLE PROJECTS EXHIBIT

- 6 pages
- Supplement to Owner/Architect Agreement
- Sets forth performance criteria
- Establishes review and accountability standards
- Schedule and scope limitations
- Includes options for 3rd party certification

PROCESS | IMPLEMENTATION

RESEARCH

SELECTION

COORDINATION

SPECIFICATION

DESIGN

ADMINISTRATION

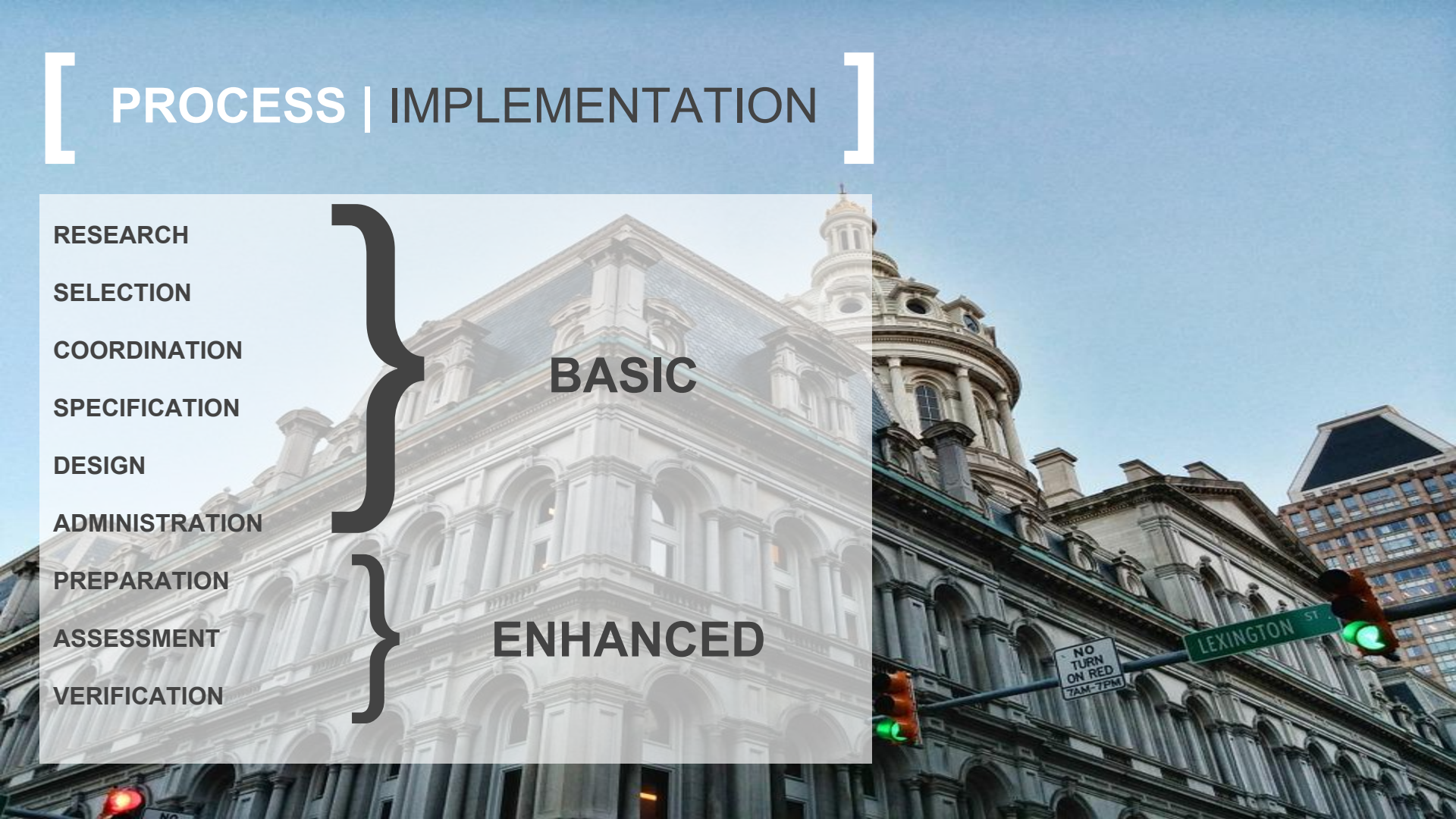
BASIC

PREPARATION

ASSESSMENT

VERIFICATION

ENHANCED



PROCESS | IMPLEMENTATION

RESEARCH

SELECTION

COORDINATION

SPECIFICATION

DESIGN

ADMINISTRATION

BASIC

PREPARATION

ASSESSMENT

VERIFICATION

ENHANCED

ASSESSMENT AND CERTIFICATION

CODE-REQUIRED INSPECTIONS
Concrete; Structural Steel; Framing & Rough-In; Insulation

BASIC COMMISSIONING / TESTING
IECC duct leak testing; May also include lighting, hot water, energy systems

PROCESS | IMPLEMENTATION

RESEARCH

SELECTION

COORDINATION

SPECIFICATION

DESIGN

ADMINISTRATION

BASIC

PREPARATION

ASSESSMENT

VERIFICATION

ENHANCED

ASSESSMENT AND CERTIFICATION

ENHANCED COMMISSIONING
Systems manual; Personnel Training; Commissioning Specifications and Inspections; Systems Operations Review

PROCESS | IMPLEMENTATION

RESEARCH

SELECTION

COORDINATION

SPECIFICATION

DESIGN

ADMINISTRATION

BASIC

PREPARATION

ASSESSMENT

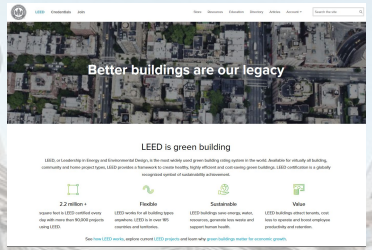
VERIFICATION

ENHANCED

ASSESSMENT AND CERTIFICATION

SUSTAINABILITY COMMISSIONING

LEED, Green Globes, Living Building Challenge, BREEAM…



THE COST OF GREEN

There will always be a large variation in the cost of the design and construction of buildings. **The majority of cost is based on project program and site.**

There are low and high cost per square foot buildings that feature green design strategies.

There are low and high cost per square foot buildings that do not feature green design strategies.

The **overwhelming** majority of construction projects already implement sustainable design strategies, regardless of whether they pursue 3rd party certification.

THE COST OF GREEN

Re-examining the feasibility and cost impacts of sustainable design in the light of increased market adoption

Davis Langdon, 2006

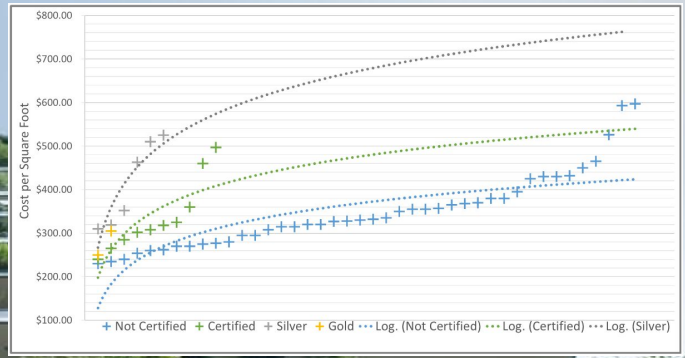
60 Academic Buildings

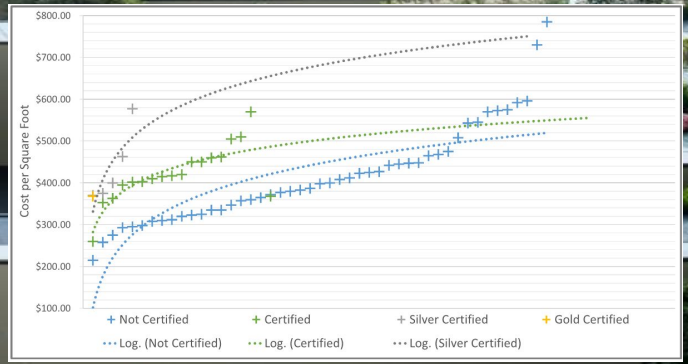
17 LEED-Seeking; 43 Non-LEED Seeking

70 Laboratory Buildings

26 LEED-Seeking; 44 Non-LEED Seeking

SOURCE: http://sustainability.ucr.edu/docs/leed-cost-of-green.pdf





THE COST OF GREEN

Sustainable design policy and strategy **should not be determined on the basis of cost**, but on your brand.

Don’t let the perception of added cost drive your brand of sustainability.

THE COST OF GREEN

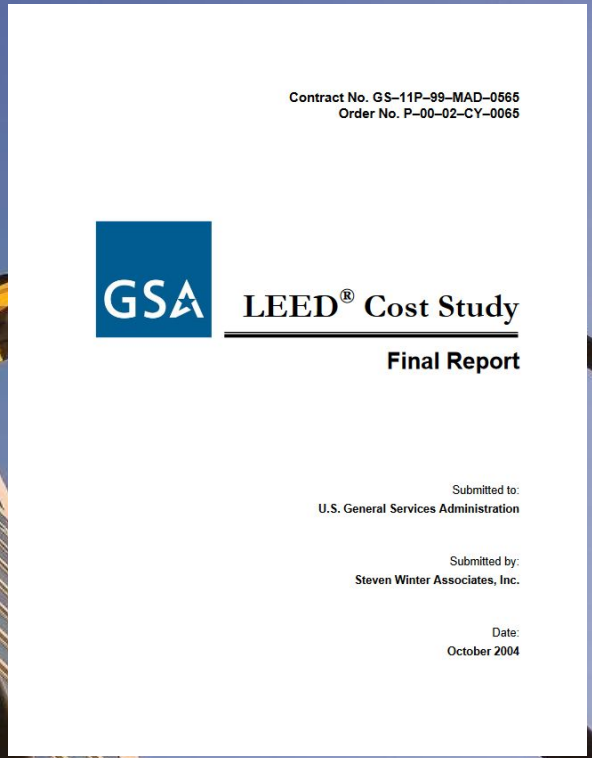
300,000 SF FACILITY

“BASIC” SUSTAINABLE DESIGN SERVICES
$0.35 - $0.45 / GSF

“ENHANCED” SUSTAINABLE DESIGN SERVICES
$0.40 - $0.55 / GSF

“MAXIMUM” SUSTAINABLE DESIGN SERVICES
$0.55 - $0.80 / GSF

SOURCE: https://archive.epa.gov/greenbuilding/web/pdf/gsaleed.pdf



Contract No. GS–11P–99–MAD–0565
Order No. P–00–02–CY–0065

GSA

LEED® Cost Study

Final Report

Submitted to:
U.S. General Services Administration

Submitted by:
Steven Winter Associates, Inc.

Date:
October 2004

QUESTIONS