AUSTIN ENERGY
GREEN BUILDING

COMMERCIAL
GUIDEBOOK

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Table of Contents

Introduction 3
The Green Building Process 3
About the Guidebook 5
BASIC REQUIREMENTS 6
1. Building Systems Commissioning 6
2. Storm Water Run-off & Water Quality Control 7
3. Roofing to Reduce Heat Island 7
4. Building Energy Use Efficiency 8
5. Building Water Use Reduction 9
6. Low VOC Interior Paints and Coatings 10
7. Storage and Collection of Recyclables 10
8. Construction Waste Management 11
T E A M 12
1. Integrated Project Design Team and Sustainable Goals 12
S I T E 13
1. Site Selection 13
1a. – Environmental Sensitivity 13
1b. – Desired Development Area 13
2. Diverse, Walkable Communities 14
3. Brownfield Redevelopment 15
4. Site Characteristics Study 15
5. Transportation Alternatives 16
5a. – Public Transportation 16
5b. – Bicycle Use 16
5c. – Parking Capacity 17
6. Site Development 17
6a. – Protect or Restore Open Areas 18
6b. – Maximize Vegetated Open Area 18
7. Additional Heat Island Reduction 18
7a. – Site 19
7b. – Roof 19
8. Light Pollution Reduction 20
9. Integrated Pest Management 22
10. Outdoor Environmental Quality 22
E N E R G Y 23
1. Additional Energy Use Efficiency 23
2. Green Energy 24
3. Renewables 25
4. Additional Commissioning 26
5. District Cooling 26
W A T E R 27
1. Irrigation Water Minimization 27
2. Indoor Potable Water Use Reduction 28
3. Stormwater Management 29
INDOOR ENVIRONMENTAL QUALITY 31
1. Indoor Air Quality Monitoring 31
2. Indoor Chemical & Pollutant Sources 31
3. Daylighting 32

4. Views to Outside 32
5. Thermal Comfort 33
6. Individual Controllability 33
7. Low-Emitting Materials 34
7a. – Sealants and Adhesives 34
7b. – Flooring System 34
7c. – Composite Wood and Agrifiber Products 35
7d. – Insulation 35
8. Moisture Protection 35
9. Acoustic Quality 36
10. Outdoor Pollutant Control 37
11. Construction Indoor Air Quality 38

M A T E R I A L S & R E S O U R C E S 39

1. Additional Construction Waste Management 39
2. Building Reuse 40
2a. – Envelope and Structure 40
2b. – Interior Non-Structural Elements 40
3. Salvaged Materials 40
4. Recycled Content 41
5. Texas Sourced Materials 41
6. Certified Wood 42
7. Low VOC Paints, Coatings, Adhesives, and Sealants 42

E D U C A T I O N 44

1. Educational Outreach 44

I N N O V A T I O N 45

Appendix: General Green Building Resources 46

AEGB Commercial Ratings:

1 Star	Basic Requirements
2 Star	30-36 points
3 Star	37-43 points
4 Star	44-48 points
5 Star	59 or more points

Introduction

The Green Building Process

Great buildings don't just happen- They're planned green from the start.
Austin Energy Green Building (AEGB) promotes an integrated team approach to design which results in a better product. The building is better because it's healthier, it's more efficient and it's more environmentally friendly. Getting started early ensures that you take full advantage of our consulting services. On your end, participation in AEGB Commercial entails:

At Your Earliest Convenience:

- Complete the first two tabs of the Rating Packet. These two tabs contain information about the project that we require for our files. You may not have made all of the team selections at this time, feel free to leave fields blank; come back and fill the fields in as you know more about the project. The preferred method of keeping up with the rating as the project progresses is to post the Rating Packet on an FTP site. Provide access to AEGB, the design team members, as well as the contractor. Any outstanding issues that need attention can be posted in real time. When updates to the Rating Packet or to any of the calculators are made, just let the project team know, and we can all respond quickly.
- When zoning or other City of Austin criteria requires an AEGB Rating, please execute and return the AEGB Letter of Intent. **Upon receipt of the populated first two tabs of the Rating Packet, we will sign and return the LOI. You will need to present the completed LOI to Land Use Review in order to receive a Site Development Permit.**
- Provide AEGB with a copy of the project schedule, including the major deadlines. This is important information you can provide to help us stay abreast with your project.
- During this planning phase we request a face to face meeting with the entire design team. This will provide an opportunity to introduce features of AEGB Commercial you might not be familiar with and provide an opportunity to answer any questions you may have about the Rating Packet. This meeting is a great way to set the tone for a successful project.

Schematic Design: As you enter Schematic Design, provide AEGB with:

- Updated Rating Packet.

This will provide an opportunity to see how ideas from the planning meeting are developing.

50% Design Development: As you approach 50% Design Development, provide to AEGB:

- ½ size set of drawings,
- Project Specifications, if available, and
- Updated Rating Packet.

This will enable our team to perform a review to ensure that recommendations are being interpreted correctly and showing up on the plans.

100% Design Development: At the 100% Design Development phase, provide to AEGB:

- ½ size set of drawings,
- Project Specifications, if available, and
- Updated Rating Packet.

50% Construction Documents: At the 50% Construction Document phase, provide to AEGB:

- ½ size set of the drawings,
- Project Specifications,
- a first pass at the ComChecks for lighting and envelope or alternatively, a first pass at the energy modeling, and

- Updated Rating Packet, with a first pass at the water calculator.

Building Permit Set: As you complete the building permit set, please provide:

- ½ size set of the drawings,
- Project Specifications,
- Updated Rating Packet with the water calculator complete,
- Commissioning (Cx) Plan draft, and
- Final ComCheck for lighting and envelope, or final energy model.

Upon satisfactory review of these documents, AEGB will issue Conditional Approval. When zoning or other City of Austin criteria require an AEGB Rating, the **AEGB Conditional Approval letter must be attached to the front of the building permit set *at the time of intake* with WPDR.**

Pre-Construction: As you prepare for construction, provide:

- Updated Rating Packet,
- Construction Waste Management Plan, and
- Commissioning (Cx) Plan.

The Commissioning Plan and the Construction Waste Management Plan are two imperative components of participation in the AEGB Commercial, therefore we require these plans are in place before construction begins.

Construction: During Construction, provide monthly updates of:

- Building materials information,
- Rating Packet,
- Construction Waste Management Calculations, and
- Submittals *upon request only*.
- In addition, our program consultants would like to perform regular site visits. Please coordinate access to the building site with your AEGB contacts as necessary.

Substantial Completion: Once the project has reached substantial completion, provide:

- Updated Rating Packet, and
- Cx Report draft including pre-functional test results and all supporting documentation.

Upon satisfactory review, AEGB will issue a preliminary rating. When zoning or other City of Austin criteria require an AEGB Rating, this **preliminary rating may be necessary to acquire a Certificate of Occupancy.**

Post Construction: As construction wraps up, provide:

- Final Rating Packet, including all the finalized calculators, and
- Final Commissioning (Cx) Report.
- Design team meeting to generate a project case study.

This will enable our team to generate your project's final rating, and issue rating certificates.

If you have any questions regarding any of these deliverables, please feel free to contact your AEGB contacts. They are here to help you through every step in the process. You will be receiving feedback at every step, letting you know how your building is being rated.

We ask that all packages be made deliverable to:
Sophie Roark
Austin Energy Green Building
Physical Address: 811 Barton Springs Road, 3rd Floor
Austin, TX 78704
(512) 482-5376
fax (512) 482-5441

About the Guidebook

The Austin Energy Green Building Rating is organized into eight categories: Basic Requirements, Team, Site, Energy, Water, Indoor Environmental Quality, Materials and Resources, and Education. An additional category, Innovation, addresses sustainable building measures not covered in the eight primary categories. This Guidebook is a supporting document to the AEGB Rating. It is intended to assist the project team in understanding the purpose or intent of each sustainable building measure and the requirements and documentation needed for compliance to earn point(s). The following template is applied to each measure.

Intent – The purpose of the measure and the benefits
Requirements – Criteria to earn point(s)
Required Documentation – Documentation required for an AEGB Rating
References – Supporting resources

The title line for each measure includes the number of points awarded for achieving the measure as well as any rebate, indicated by a $, through Austin Energy. Additional information specifically addressing rebates and general information about green building is referenced in the Appendix. Due to the dynamic nature of websites, please bring to the attention of AEGB any referenced websites that are non-functioning.

Disclaimer

AEGB does not make any warranty (expressed or implied) or assume any liability or responsibility, to you or any third parties for the accuracy, completeness or use of, or reliance on, any information contained in the AEGB Commercial Guidebook and Packet. Any discrepancies between the AEGB Commercial Guidebook and Packet are unintentional and will be resolved by AEGB.

BASIC REQUIREMENTS

1. Building Systems Commissioning

Intent
A commissioning authority with documented commissioning experience on at least two other building projects will verify and ensure that mechanical and electrical systems are installed and calibrated to operate according to the Owner Project Requirements (OPR) and Basis of Design (BOD). This reduces operating costs by keeping mechanical and electrical building systems compliant with warrantees and operating as designed resulting in a comfortable environment for building occupants.

Requirements
Develop Owner Project Requirements and Basis of Design documentation.
Include commissioning requirements in the construction documents.
Develop and utilize a commissioning plan.
Verify installation, functional performance, and training for maintenance staff.
Provide O&M documentation.
Complete a commissioning report.

Required Documentation
- Owner Project Requirements.
- Basis of Design.
- Commissioning Specifications.
- Commissioning Plan.
- Commissioning Report.
- O & M Documentation.

References
Commissioning Site and Functional Testing and Design Guides - Portland Energy Conservation, Inc.:
http://peci.org/CxTechnical/Tools_Guides/guides.html
www.peci.org/ftguide/
Commissioning guidance and procurement - Energy Design Resources:
www.energydesignresources.com/category/commissioning/
Association of Certified Commissioning Authorities AABC Commissioning Group (ACG):
www.commissioning.org
"The Commissioning Process" ASHRAE Guideline 0-2005: ISSN 1049-894X.
National Institute of Building Sciences - Whole Building Design Guide:
www.wbdg.org/index.php

2. Stormwater Run-off & Water Quality Control

Intent
Effective management of stormwater run-off and water quality control is imperative to reducing the impact of run-off on stormwater infrastructure, flooding, erosion and water pollution.

Requirements
Meet current city drainage and water quality standards and ordinances for the project site watershed.

Required Documentation
- Approved Water Quality Control Plan.

References
For Run-off: Environmental Criteria Manual – Section 1.9.0
For Water Quality: Environmental Criteria Manual – Land Development Code [LDC 25-8-211]

Land Development Code - City of Austin:
www.amlegal.com/austin_nxt/gateway.dll/?f=templates$fn=altmain-nf.htm$vid=amlegal%3Aaustin_tx$3.0
Watershed Ordinance Summary Map - City of Austin:
www.ci.austin.tx.us/watershed/ordinance_map.htm
Edwards Aquifer Recharge Zone Map:
www.tceq.state.tx.us/compliance/field_ops/eapp/mapdisclaimer.html
Drainage Criteria Manual - City of Austin:
www.amlegal.com/austin_nxt2/gateway.dll?f=templates&fn=default.htm&vid=amlegal:austin_drainage
Environmental Criteria Manual - City of Austin:
www.amlegal.com/austin_nxt2/gateway.dll?f=templates&fn=default.htm&vid=amlegal:austin_environment
Watershed Ordinances Regulations Summary Table - City of Austin:
www.ci.austin.tx.us/watershed/ordinance_table.htm

3. Roofing to Reduce Heat Island

Intent
Urban Heat Islands are characterized by increased temperatures which affect the formation of ground-level ozone or smog, local weather patterns and the performance of air conditioning and refrigeration equipment. High reflectance roofing and vegetated roofing reduces the urban heat island effect and contributes to lower building energy operating costs. Additionally, vegetative roofs reduce rate and quantity of storm water runoff.

Requirements
The City of Austin Energy Code establishes minimum reflectance requirements for roof surfaces corresponding to ASTM E903-96, ASTM 1918-97 or ASTM 1549-04. [Ordinance No. 20071018-088 Section 502.7]

Roof Type	Slope	Solar Reflectance	OR	SRI
Low-Sloped Roof	< 2:12	0.70		78
Steep-Sloped Roof	≥ 2:12	0.35		29

Meet or exceed these requirements with any combination of qualified roofing material and vegetated roofing for the *total roof area**

**Total Roof Area* excludes pools, patios, parapets, ancillary installations (e.g., HVAC equipment, water heaters, photovoltaic and solar thermal panels), and integrated photovoltaic systems.

Required Documentation
- Product specifications.
- Roof plans.
- Roofing material submittals showing City of Austin Energy Code compliance.

References
City of Austin Energy Code Ordinance and Amendments:
www.cityofaustin.org/edims/document.cfm?id=109740
Energy Star Roof Products:
www.energystar.gov/ia/products/prod_lists/roof_prods_prod_list.pdf
Energy Star Roof Savings Calculator:
www.roofcalc.com/RoofCalcBuildingInput.aspx
Green Roof Directory:
www.greenroofs.com

4. Building Energy Use Efficiency $

Intent
The Energy Code establishes minimum regulations for energy-efficient buildings. Exceeding these standards further reduces building energy consumption and load and contributes to the reduction of conventional power plant construction, green house gas emissions, and building operating costs.

Requirements

OPTION 1 - Exceed current City of Austin building envelope and interior lighting requirements by 15% each.

OPTION 2 - Exceed the ASHRAE/IESNA 90.1-2004 Appendix G Building Performance Rating Method code building by 15%.

Required Documentation
- Completed and signed COM*check*™ Envelope and Interior Lighting Code Compliance Certificates for Option 1.

OR

- Narrative describing the building envelope, systems, and energy saving measures incorporated into building.
- Energy model inputs and results recorded in the AEGB Energy Analysis Summary Form. The energy model demonstrates building design performance over Energy Code baseline using a Building Energy Hourly Simulation and Load Program such as: Energy Plus[1], Carrier HAP[1], Trane Trace[1], EnergyGauge Summit[1], Energy 10, eQUEST, DOE-2 for Option 2.
- Product specifications and cut sheets for envelope materials and lighting systems highlighting pertinent performance values.

References
COM*check*™:
www.energycodes.gov/comcheck/
Energy Code Ordinance and Amendments - City of Austin:
http://www.cityofaustin.org/edims/document.cfm?id=109740
ASHRAE/IESNA 90.1-2004, *Energy Standard for Buildings Except for Low-Rise Residential Buildings:*
www.realread.com/prst/pageview/browse.cgi?book=1931862664
[1]IRS Qualified Energy Modeling Software List for Energy Efficiency Tax Deduction:
http://www.eere.energy.gov/buildings/info/qualified_software/

5. Building Water Use Reduction $

Intent
High efficiency plumbing fixtures reduce consumption of water for indoor use thus lessening the impact on the water supply and treatment facilities and reducing building operating costs by saving water and associated energy use.

Requirements
Reduce planned indoor potable water consumption below the baseline by 10%. The volume and flow rates for standard plumbing fixtures used to establish the baseline are set by the current ASME/ANSI Standards and City of Austin Ordinance No. 20071018-086 Section 411.3.1.

Required Documentation
- Plumbing fixture specifications and submittals
- AEGB Building Water Use Reduction Calculator.

References
Plumbing fixtures and performance requirements - Water Conservation Department, City of Austin:
www.ci.austin.tx.us/watercon/
EPA **WaterSense** labeled High Efficiency Toilets and Faucets:
www.epa.gov/watersense

6. Low VOC Interior Paints and Coatings

Intent
Low VOC (volatile organic compound) interior paints and coatings reduce toxic pollution and waste thus conserving natural resources and habitats and minimizing global warming and ozone depletion, in addition to contributing to good indoor air quality for the benefit of the health and productivity of building occupants.

Requirements
All paints, primers, and anti-corrosive coatings applied on-site to the building interior must not exceed the VOC limit of Green Seal Environmental Standard GS-11 as shown below. All coatings applied on-site to the building interior must not exceed the current VOC limit of SCAQMD Rule 1113. *If a specialty product does not have a low VOC option, contact your AEGB representative for approval prior to application.*

I. All paints, primers, and anti-corrosive coatings applied on-site to the interior of the building must not exceed the VOC limit of Green Seal Environmental Standard GS-11.

Paint Type	VOC Limit (g/L)*
Non-flat Topcoat	100
Flat Topcoat	50
Primer	100
Anti-Corrosive Coating	250

* The calculation of VOC shall exclude water and colorants added at the point-of-sale.

II. Coatings applied on-site to the interior of the building must not exceed the current VOC limit of SCAQMD Rule 1113 for clear wood finishes, floor coatings, stains, sealers and shellacs, and all other applicable coatings

Required Documentation
- Product specifications and submittals.
- Tabulation using the AEGB Low Emitting Materials Form.

References
Green Seal GS-11, Paints and Coatings, 2nd Edition May 12, 2008:
www.greenseal.org/certification/standards/paints_and_coatings.pdf
SCAQMD Rule 1113, Coatings:
www.aqmd.gov/rules/reg/reg11/r1113.pdf

7. Storage and Collection of Recyclables

Intent
The collection of recyclables reduces waste generated by building occupants and building operations that is directed to the landfill extending the life of the landfill and saving energy and resources through the recycling process.

Requirements

Provide an easily accessible area, that serves the entire facility, dedicated to the separation, collection, and storage of materials for recycling including, at a minimum, the top two (four is required for multi-family/apartments with 100 units or more) identified recyclable waste stream items. Building loading dock or pick-up location must be sized appropriately to handle the recycling material volumes generated by the building occupants.

Required Documentation

- Site plan indicating recycling collection center.
- Completed City of Austin Solid Waste Services - Multi-family and Commercial Recycling Plan form.

References

Recycling Ordinance - City of Austin:
www.ci.austin.tx.us/sws/recyclerules.htm
Sustainable Building Sourcebook – Austin Energy Green Building:
www.austinenergy.com/Energy%20Efficiency/Programs/Green%20Building/Sourcebook/commercialRecycling.htm

8. Construction Waste Management

Intent

Construction waste management includes recycling or salvaging of construction, demolition/deconstruction and land clearing waste to reduce the amount of waste destined for the landfill or incineration disposal thus, saving in disposal costs, extending the life of the landfill, and saving energy, resources, and material costs in their reuse.

Requirements

Recycle and/or salvage at least 50% (by weight) of non-hazardous construction and demolition waste excluding excavated soil and stone.

Required Documentation

- Specifications for Construction Waste Management in the Contract Documents.
- Construction Waste Management Plan.
- Calculations from AEGB Construction Waste Calculator.
- Copies of weight tickets for recycling, salvage, and landfill.

References

Sustainable Building Sourcebook – Austin Energy Green Building:
www.austinenergy.com/Energy%20Efficiency/Programs/Green%20Building/Sourcebook/constructionWasteManagement.htm

T E A M
Integrating the Design Team, Setting and Achieving Sustainability Goals

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1. Integrated Project Design Team and Sustainable Goals

1 point

Intent
An integrated project design team approach, where every aspect of the design process is examined by the project team, is essential in achieving the sustainable goals. Setting sustainability goals early in the design process maximizes the potential for incorporating these goals into the project phases and ultimately achieving a sustainable building.

Requirements
Choose project team professionals and consultants early in design phase who are experienced in sustainable design.
Establish and document sustainability goals.
Throughout the Programming, Schematic Design, DD & CD, and Construction phases, hold sustainability meetings with the entire project team to restate project goals and the Owner Project Requirements (OPR), track the progress toward meeting the project goals and obtaining an Austin Energy Green Building Star Rating.
The Basis of Design (BOD), Plans, and Specifications clearly explain the sustainability goals of the project.
Incorporate the green elements of the project and proposed certification into the pre-construction meeting with all subcontractors who will be affected by them, include, at a minimum, project goals and the OPR.

Required Documentation
- o List of project team professionals.
- o Document stating Sustainability goals developed during the Schematic Design phase acknowledged by the Project Team.
- o Minutes of the project team meetings showing attendees and sustainable goal updates and tracking communication at critical design, bidding and construction phases.
- o Plans and specifications clearly indicating sustainability goals for the project.
- o Regularly update and submit the AEGB Worksheet to log progress toward meeting project sustainability goals.

References
Whole Building Design Guide discusses approach and process - National Institute of Building Sciences:
www.wbdg.org/index.php
Design approach, guidelines and tools - U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy:
www.eere.energy.gov/buildings/highperformance/

S I T E
Sustainability through Site Selection

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1. Site Selection

Intent
As the population of Central Texas increases two-fold in the next 2 to 3 decades, effectively manage the impact of growth through site selection for new developments and buildings that utilizes the existing municipal infrastructure and preserves our natural resources.

1a. Environmental Sensitivity **2 points**

Requirements
Project site is not in the Drinking Water Protected Zone which includes the Barton Springs Zone, Barton Creek Watershed, Edwards Aquifer Recharge and Contributing Zone, and Balcones Canyon Land. Also, project site is not a Greenfield defined as a parcel of land not previously developed beyond that of agriculture or forestry use.

Required Documentation
- Print out of the GEO Profile identifying site location and Watershed Classification from the Watershed Development Map GIS Viewer. Include site address.
- Pre-construction description of site as a non-greenfield site.

References
Watershed Development Map GIS Viewer - City of Austin:
http://coagis1.ci.austin.tx.us/website/COAViewer_dev/viewer.htm

Watershed Classification Report using the GIS Viewer. First, select *Address* from the Viewer Tools menu on the left menu bar. Enter the address or street name and intersection. The Development GIS will bring up the map. To see on the map the Watershed Regulation Area, select *Austin Watershed Regulation Areas* from the Layers Menu on the right, then refresh map. Select the LEGEND tab on the right to see if the address is located in the Suburban or Urban (Site 1b) Watershed Regulation Area. To get a report of the Watershed Classification, (set browser to allow pop-ups), Select *Geo Profile* from the left menu bar and point and click to the location on the map and a GeoProfile Search Results page will open. Scroll down to page 2 to see Watershed Classification. If the SDE. Waterreg. Watername is Suburban or Urban, this address qualifies for Site1a. Urban also qualifies for Site1b. BSZ, Water Rural and Water Supply Suburban do not qualify for Site1a or Site1b.

Watershed Ordinance Map - City of Austin:
www.ci.austin.tx.us/watershed/ordinance_map.htm

1b. Desired Development Area **4 points**

Requirements
Project site is located within the Urban Watershed Desired Development Zone.

Required Documentation

- Print out of the GEO Profile identifying site location and Watershed Classification from the Watershed Development Map GIS Viewer. Include site address.

References

Watershed Development Map GIS Viewer - City of Austin:
http://coagis1.ci.austin.tx.us/website/COAViewer_dev/viewer.htm
Watershed Ordinance Map - City of Austin:
www.ci.austin.tx.us/watershed/ordinance_map.htm

2. Diverse, Walkable Communities 1 point

Intent

Promote livable, walkable, and bikeable communities that encourage efficient transportation and a mix of community-oriented businesses. Promote safe pedestrian access between proposed building(s) and neighborhood paths as well as safe connections to nearby destinations.

Requirements

Building(s) connects with neighboring properties with pedestrian and/or bicycle only paths (shading is preferred) that are separate from vehicular traffic.

Project includes or is located within ½ mile walking distance of residences and at least 10 Basic Services:

Basic Services include, but are not limited to:
1) Bank, 2) Place of Worship, 3) Convenience Grocery, 4) Daycare, 5) Cleaners, 6) Fire Station, 7) Beauty, 8) Hardware, 9) Laundry, 10) Library, 11) Medical / Dental, 12) Senior Care Facility, 13) Park, 14) Pharmacy, 15) Post Office, 16) Restaurant, 17) School, 18) Supermarket, 19) Theater, 20) Community Center, 21) Fitness Center, 22) Museum

Basic services must be accessible via a safe route explicitly intended for use by the pedestrian that does not require crossing a road more than 5 lanes wide or 35 miles per hour.

Required Documentation

- Vicinity plan with Residences and Basic Services highlighted and pedestrian path distance measured between project and each location.
- Narrative describing how a pedestrian makes the connection between the proposed building(s) and the Basic Services. Include suggested route to cross vehicular traffic and photographs of difficult to describe connections.

References

To identify basic services and distances for a given address - Walk Score™ Maps:
www.walkscore.com/index.shtml
Geographic Information Systems (GIS) facilities shape files on City of Austin website:
ftp://coageoid01.ci.austin.tx.us/GIS-Data/Regional/coa_gis.html
Oregon Bicycle and Pedestrian Planning and Design Manual:

www.oregon.gov/ODOT/HWY/BIKEPED/planproc.shtml
City of Austin Design Standards and Mixed-Use Subchapter, Section 2.3 Connectivity:
http://www.ci.austin.tx.us/development/downloads/final.pdf

3. Brownfield Redevelopment 1 point

Intent
Rehabilitate sites where development is complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant as defined by CERCLA §104(k) the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 to revitalize communities, utilize existing infrastructures taking development pressures off of undeveloped, open land, and improve and protect the environment.

Requirements
Project demonstrates effective remediation of site contamination (using established technologies that have minimal disruption on the site's natural features above and below ground).

Required Documentation
- Documentation on the Brownfield classification and verification of remediation efforts.

References
EPA Preliminary Remediation Goals:
www.epa.gov/region09/waste/sfund/prg/index.html
EPA Sustainable Redevelopment of Brownfields Program, legal definition, grants and loans:
www.epa.gov/brownfields/
Brownfields Redevelopment Office Services - City of Austin:
www.ci.austin.tx.us/watershed/brownfieldsdo.htm
Brownfields Site Assessment Program – Texas Commission on Environmental Quality:
www.tceq.state.tx.us/remediation/bsa/bsa.html

4. Site Characteristics Study 1 point

Intent
Reduce the impact of the structures on the environment and optimize building placement on a site.

Requirements
Evaluate and document the proposed site's environmental characteristics.
- Document existing water elements, soil conditions, ecosystems and natural habitats, trees, and other vegetation, and seasonal wind and daylight availability.
- Map all potential hazards including traffic and pollution sources.

Create a plan to maintain or restore existing site features.
Develop recommendations for building placement on site to minimize impact on the environment and to take advantage of topographical characteristics.

Required Documentation

- Report documenting existing water elements, soil conditions, ecosystems and natural habitats, trees and other vegetation, and seasonal wind and daylight availability. To include: Pre-construction map indicating all potential natural hazards including traffic and pollution sources, a plan to maintain or restore existing site features, and recommendations for building placement to minimize environmental impact.

References

Sun Path Chart useful in passive design considerations:
http://solardat.uoregon.edu/SunChartProgram.html

5. Transportation Alternatives

Intent

Reduce pollution and development impact from automobile use.

5a. Public Transportation **1 point**

Requirements

Building entrance is located within 1/4 mile of at least 2 Capital Metro bus stops or within 1/2 mile of a rail stop (or future rail stop with proposed completion within 5 years).

Required Documentation

- Area site plan highlighting the public transportation lines and stops with distance from the building's main entry to each indicated.

References

Austin Capital Metro Transit identifies services near a given location:
www.capmetro.org/riding/trip_info.asp
Austin Transit Oriented Development Districts - objectives and locations:
www.ci.austin.tx.us/planning/tod/default.htm
ftp://coageoid01.ci.austin.tx.us/GIS-Data/planning/TOD/tod_districts.pdf
Envision Central Texas:
www.envisioncentraltexas.org

5b. Bicycle Use **1 point**

Requirements

Project incorporates bicycle securing areas and shower / changing facilities that accommodate 10% or more of the building occupants.
Provide one bicycle parking space for each rider and one shower for every twenty-five riders.
Provide a bikeway for safe connectivity from public corridors to building facilities.

Required Documentation

- Calculations demonstrating total building occupancy, required quantity of bicycle securing areas and shower / changing locations as indicated above.
- Building and/or site plan indicating bicycle rack locations and capacities.
- Building plans indicating locations and capacities of shower and changing areas.
- Specifications of bicycling securing systems.
- Site plan indicating safe bicycle/pedestrian routes.

References

City of Austin Bicycle and Pedestrian Program including Bicycle Route Map:
www.ci.austin.tx.us/bicycle/
Bicycle Austin discusses bicycle transportation issues in Austin:
bicycleaustin.info/
Oregon Bicycle and Pedestrian Planning and Design Manual:
www.oregon.gov/ODOT/HWY/BIKEPED/planproc.shtml

5c. Parking Capacity **1 point**

Requirements

Parking does not exceed minimum local zoning requirements.
Parking area provides preferred parking for carpools for at least 5% of building occupants.

Required Documentation

- Copy of the local zoning requirements highlighting the minimum parking capacity criteria.
- Parking plan highlighting the total parking capacity and preferred parking locations for carpools.
- Documentation demonstrating that carpool programs serve 5% of the building occupants.

References

City of Austin Land Development Code Ch 25-6-471, Off-street parking and loading:
www.amlegal.com/austin_nxt/gateway.dll/Texas/austin/title25landdevelopment/chapter25-6transportation?f=templates$fn=altmain-nf.htm$3.0#JD_25-6-471

6. Site Development

Intent

Limit site disturbance or restore damaged open areas to provide habitat and promote biodiversity.

6a. Protect or Restore Open Areas **1 point**

Requirements
Greenfield sites: *Site not previously developed or graded.*
Plan to limit disturbance to 40 ft beyond the building perimeter; 10 ft beyond walkways, patios, and surface parking; 15 ft beyond roadways and utility trenches; and 25 ft beyond any pervious areas that require additional staging.

Previously developed sites: *Site previously contained buildings, roadways, parking lots, or was graded.*
At least 50% of the post-development open area (site area minus building footprint) is vegetated using native/adapted plants. Vegetated roof areas may be included in the open area calculations, if the plants meet the definition of native/adapted.

Required Documentation
- Greenfield sites:
  Site plan clearly indicating limits of construction (site disturbance boundaries) as indicated above and locations of planned development within those constraints

- Previously developed sites:
  Landscaping plan including plant list and open area calculations demonstrating that at least 50% is vegetated.

References
Grow Green Guide for native and adapted plant listings - City of Austin:
www.ci.austin.tx.us/growgreen/plants.htm

6b. Maximize Vegetated Open Area **1 point**

Requirements
Provide vegetated open area using native/adapted plants equal to 20% of the project site area. Vegetated roof areas may be included in the vegetated open area calculations, if the plants meet the definition of native/adapted.

Required Documentation
- Site/landscape plan indicating vegetated open areas including plant list.
- Area calculations of project site and vegetated open areas.

References
Grow Green Guide native and adapted plant listings - City of Austin:
www.ci.austin.tx.us/growgreen/plants.htm

7. Additional Heat Island Reduction

Intent
Urban Heat Island is characterized by increased temperatures which affect the formation of ground-level ozone or smog, local weather patterns and the performance of air conditioning and refrigeration equipment. Heat island effects can be reduced by

designing site impervious surfaces to include vegetated open-grid pavement systems, high albedo surface treatments, and vegetative shading and roofing surfaces with high reflectance coatings. The resulting reduction in the heat island effect for the microclimate surrounding the building contributes to improved air quality and building cooling energy savings.

7a. Site **1 point**

Requirements

OPTION 1 – Provide any combination of the following strategies for 50% of the site hardscape.

- Vegetated open-grid pavement system (at least 50% pervious).
- High-albedo paving materials with a Solar Reflectance Index of at least 29.
- Vegetative shading planted over the non-roof impervious surfaces within five years.

OPTION 2 - At least 50% of the parking spaces located underground or in structured parking with a top deck surface SRI of at least 29.

Required Documentation

- Copy of site plan and narrative indicating method utilized at various locations and their associated areas.
- Area calculations for the entire site demonstrating that the minimum requirements are met.
- Product specifications.

References

Design strategies and benefits to mitigating Heat Island – Heat Island Group:
eetd.lbl.gov/HeatIsland/
Design strategies to mitigate Heat Island affect - EPA:
www.epa.gov/heatisland/index.html
Grow Green Guide native and adapted plant listings - City of Austin:
www.ci.austin.tx.us/growgreen/plants.htm
"Albedo: A Measure of Pavement Surface Reflectance", American Concrete Pavement Association:
www.pavement.com/Downloads/RT/RT3.05.pdf

7b. Roof **1 point**

Requirements

Install any combination of high albedo roofing materials that have Solar Reflectance **or** Solar Reflectance Index (SRI) equal to or greater than the values indicated in the table below and vegetated roofing material for the *total roof area*.

**Total Roof Area* excludes pools, patios, parapets, ancillary installations (e.g., HVAC equipment, water heaters, photovoltaic and solar thermal panels), and integrated photovoltaic systems.

Roof Type	Slope	Solar Reflectance		SRI
Low-Sloped Roof	< 2:12	0.75	**OR**	85
Steep-Sloped Roof	≥ 2:12	0.45		35

Required Documentation
- Product specifications and cut sheets for roofing materials and systems.
- Roof Plans and submittals.

Standards
Solar Reflectance is measured according to ASTM E 903, ASTM E 1918, or ASTM C 1549.
Solar Reflectance Index is measured according to ASTM E 1980.
Thermal Emittance is measured according to ASTM E 408 or ASTM C1371.

Definitions
Solar Reflectance (albedo) is the ratio of the reflected solar energy to the incoming solar energy. A reflectance of 100% means that all of the energy striking a reflecting surface is reflected back into the atmosphere and none of the energy is absorbed by the surface.

Solar Reflectance Index (SRI) is a measure of a material's ability to reject solar heat. Materials with the highest SRI values are the coolest choices for roofing. (See Lawrence Berkley National Laboratory reference and link to Cool Roofing Materials Database.) SRI may be calculated based on solar reflectance and thermal emittance. *Contact AEGB for SRI calculator.*

Thermal Emittance indicates the ability of a material to shed infrared radiation (heat).

References
Energy Star Qualified Roofing Products:
www.energystar.gov/ia/products/prod_lists/roof_prods_prod_list.pdf
Energy Star Roof Savings Calculator:
www.roofcalc.com/RoofCalcBuildingInput.aspx
Cool Roof Rating Council and product directory:
coolroofs. org/aboutthecrrc_owners.html
Green Roof Directory:
www.greenroofs.org
Lawrence Berkley National Laboratory:
http://eetd.lbl.gov/HeatIsland/CoolRoofs/

8. Light Pollution Reduction **1 point**

Intent
Design efficient outdoor lighting systems to reduce light pollution, i.e., any adverse effect of artificial light including sky glow, glare, light trespass, and light clutter to preserve nocturnal environments.

Requirements

Exterior lighting meets the standards of the City of Austin Code – Subchapter E of Chapter 25-2: *Design Standards and Mixed Use, Article 2.5 Exterior Lighting*.
Exterior lighting meets the maximum initial illuminance values at the site boundary and beyond and the fixtures meet the percentage of lumens emitted above full cut-off requirements as outlined in Table 1 below for the appropriate zone as defined in IESNA RP-33.

Table 1: Light Trespass Criteria per Lighting Zone

Zone	Initial Illuminance (fc)	Calculated at Location relative to site boundary	Initial Lumens Emitted above Full Cutoff[1]
LZ1 – Dark (Park & Rural Setting)	0.01 horizontal & vertical	Site boundary	0%
LZ2 – Low (Residential Areas)	0.10 horizontal & vertical 0.01 horizontal	Site boundary 10 ft beyond site boundary	2%
LZ3 – Medium (Commercial/Industrial, High-Density Residential)	0.20 horizontal & vertical 0.01 horizontal	Site boundary 15 ft beyond site boundary	5%
LZ4 – High (Major City Centers, Entertainment Districts)	0.60 horizontal & vertical 0.01 horizontal	Site boundary 15 ft beyond site boundary	10%

[1]Full Cutoff is defined as an angle of 90 degrees from nadir (straight down).

Exterior lighting levels of illuminance meet the horizontal foot candles for the facilities listed in Table 2 as defined in the City of Alpine, TX Outdoor Lighting Ordinance adopted May 23, 2000. Minimum levels shall be consistent with safety and security.

Table 2: Levels of Illuminance at Specific Facilities

Parking Lots and areas	Average 2.0 fc; minimum 0.5 fc
Entry areas near buildings	Maximum 5.0 fc
Service Stations and other fueling facilities	Maximum 10 fc in the area surrounding pump islands; parking and entry areas Average 2.0 fc, minimum 0.5 fc
Sales Lots where merchandise, including automobiles, is displayed at night	Maximum 20 fc

Required Documentation

- Exterior lighting plan and schedule
- A narrative including specific information regarding the light trespass analysis
- Photometric plan
- Product specifications

References

City of Austin Code – Subchapter E of Chapter 25-2: *Design Standards and Mixed Use, Article 2.5 Exterior Lighting*:
www.ci.austin.tx.us/development/downloads/final.pdf
International Dark-Sky Association:
www.darksky.org

"Lighting for Exterior Environments" - IESNA RP-33-99, Illuminating Engineering Society of North America:
www.iesna.org
Texas Light Ordinance as demonstrated in 'An Ordinance to improve outdoor lighting in the City of Alpine, Texas:
www.iessanjacinto.org/Ordinances/Alpine_5-23-05.pdf

9. Integrated Pest Management **1 point**

Intent
Integrated pest management (IPM) is an environmentally-sound method that focuses on long-term prevention of pests in and around buildings using a least-toxic approach. The use of native and adapted plants that are naturally resistant to pests and diseases, as well as physical barriers to prevent termite infestation are a few examples of ways to control pests over the life of the building and landscape. IPM preserves the site's ecological integrity, enhances biological diversity, and protects wildlife and worker/public health and safety, and may reduce maintenance costs.

Requirements
Implement an Integrated Pest Management Plan and practices appropriate for the site and building use.

Required Documentation
- Copy of the Integrated Pest Management Plan.

References
City of Austin Integrated Pest Management:
www.ci.austin.tx.us/watershed/ipm.htm
Grow Green Guide native and adapted plants lists - City of Austin:
www.ci.austin.tx.us/growgreen/plants.htm
Massachusetts Integrated Pest Management Kit for Building Managers:
www.mass.gov/agr/pesticides/publications/docs/IPM_kit_for_bldg_mgrs.pdf

10. Outdoor Environmental Quality **1 point**

Intent
Provide outdoor places on site to enable building occupants and visitors to connect to and enjoy the natural environment.

Requirements
Shaded seating for 10% or more of the building's occupants.

Required Documentation
- Site plan and details, if necessary, indicating location of outdoor areas, seating capacities, and types of shading provided.

References
Sun Path Chart useful in shading design:
http://solardat.uoregon.edu/SunChartProgram.html

E N E R G Y
Save Energy, Use Clean Energy

1. Additional Energy Use Efficiency **1 - 12 points, $**

Intent
The energy code establishes minimum regulations for energy-efficient buildings using prescriptive and performance-related provisions. It is founded on broad-based principles that make possible the use of new materials and innovative techniques that conserve energy. Utilizing an energy modeling program as a design tool enables effective analysis of design strategies which may result in lower operating costs, increased occupancy comfort and lower carbon dioxide emissions.

Requirements
Exceed the ASHRAE/IESNA Standard 90.1-2004 Appendix G Performance Rating Method code building by 17.5% or more. One point is earned for each additional 2.5% savings.

Percent Savings	17.5	20	22.5	25	27.5	30	32.5	35	37.5	40	42.5	45
Points	1	2	3	4	5	6	7	8	9	10	11	12

Required Documentation
- Narrative describing the building envelope, systems, and energy saving measures incorporated into building.
- Energy model inputs and results recorded in the AEGB Energy Analysis Summary Form. The energy model demonstrates building design performance over Energy Code baseline building using Building Energy Hourly Simulation and Load Software such as: Energy 10, eQUEST, DOE-2, Energy Plus, Carrier HAP, Trane Trace, EnergyGauge Summit.
- Product specifications and cut sheets for envelope materials, mechanical and lighting systems highlighting pertinent performance values.

References
City of Austin Energy Code Ordinance and Amendments:
http://www.cityofaustin.org/edims/document.cfm?id=109740
ASHRAE/IESNA 90.1-2004, *Energy Standard for Buildings Except for Low-Rise Residential Buildings:*
www.realread.com/prst/pageview/browse.cgi?book=1931862664
"Advanced Energy Design Guide for Small Office Buildings" ASHRAE (2004): ISBN 1-931862-55-9.

2. Green Energy **1 point**

Intent
Green Power, electricity generated from clean, renewable sources such as wind, solar, and biomass, lowers fossil fuel burning emissions which cause global warming and pollution. Purchasing green power supports the development of renewable power in Texas. Additionally, the Austin Energy GreenChoice® fixed rate rider may result in lower operating costs as fossil fuel prices fluctuate throughout the term.

Renewable Energy Certificates (RECs) support the development of the renewable power industry in Texas or nationwide.

Requirements
Subscribe to Austin Energy GreenChoice®.

If GreenChoice® subscriptions are not available choose one of the following RECs options.
OPTION 1 - Obtain a 2-year contract for Texas RECs for 100% of the building's annual electricity use.

OPTION 2 – Obtain a 2-year contract for other national RECs that satisfy the technical requirements of the Green-e certification program for 100% of the building's annual electricity use.

The building's electricity use may be estimated using a Building Energy Hourly Simulation and Load program or the electricity intensity factors per building type from the DOE Commercial Buildings Energy Consumption Survey 2003 in the table below.

Building Type	Median Electricity Intensity (kWh/sf-yr)
Education	8.9
Food Sales	48.0
Food Service	37.4
Health Care	12.0
Inpatient	24.0
Outpatient	11.3
Lodging	11.9
Retail (other than mall)	9.4
Office	11.5
Public Assembly	5.1
Public Order and Safety	7.9
Religious Worship	3.5
Service	6.3
Warehouse and Storage	3.1
Other	7.2
Vacant	1.7

Required Documentation
- Copy of the commercial agreement with Austin Energy GreenChoice®.
- Copy of the RECs contract including name of REC vendor and value of RECs purchased (kWh) and total annual electricity consumption (kWh).

References
GreenChoice® - Austin Energy Renewable Power Program:
www.austinenergy.com/Energy%20Efficiency/Programs/Green%20Choice/
General guide to purchasing green power and RECs - EPA & Green Power Partnership:
http://epa.gov/greenpower/buygp/guide.htm

Companies selling Green-e certified RECs in Texas:
www.green-e.org/

3. Renewables

1 - 2 points, $

Intent
On-site generation of energy through the use of renewable energy technologies such as photovoltaic panels, solar thermal, and wind turbines will lower operating costs and fossil fuel burning emissions.

Requirements
On-site renewable energy system installed for 2% or 5% of the building's annual electricity use.

The building's electricity use may be estimated using a Building Energy Hourly Simulation and Load program or the electricity intensity factors per building type from the DOE Commercial Buildings Energy Consumption Survey 2003 in the table shown above in Energy Credit 2.

PV and Solar Thermal systems must meet the performance requirements of the Austin Energy PV Solar Rebate and Solar Water Heater Programs.

Required Documentation
- Calculations indicating the annual electricity requirements and amount of energy to be generated by on-site renewable energy technology.
- Copies of the required documentation from the Austin Energy PV Solar Rebate and Solar Water Heater Programs.
- Wind system sizing and performance documentation.

References
Austin Energy PV Solar Rebate Guidelines:
www.austinenergy.com/Energy%20Efficiency/Programs/Rebates/Solar%20Rebates/guidelines.htm
Austin Energy Solar Water Heater Program Guidelines:
www.austinenergy.com/Energy%20Efficiency/Programs/Rebates/Solar%20Rebates/Solar%20Water%20Heater/index.htm
Learn about renewable energy - National Renewable Energy Laboratory:
www.nrel.gov/

4. Additional Commissioning 1 point

Intent
This systematic process of ensuring that the building and all of its systems perform interactively according to the Owner Project Requirements (OPR), the Basis of Design (BOD), and the owner's operational needs through the design, construction, and warranty phases with actual verification through review, testing, and documentation of performance will result in proper and efficient equipment operations, lower operating and maintenance costs, improved indoor air quality, increased occupancy comfort and productivity, and lower energy production emissions.

Requirements
Commissioning Authority shall at a minimum conduct a design document review prior to 50% CD's.
Demonstrate that all energy systems operate according to OPR and BOD narratives (lighting systems & controls, HVAC & controls, transport systems, etc.).
Demonstrate that the building structure and envelope perform according to OPR and BOD narratives.
Provide seasonal re-commissioning through the warranty period.
Complete a commissioning report.

Required Documentation
- Commissioning report demonstrating that the energy systems, building structure and envelope all operate according to OPR and BOD.
- Signed letter of certification by the commissioning authority confirming that the commissioning plan has been successfully executed and the OPR and BOD have been achieved.

References
Commissioning and Functional Testing and Design Guides - Portland Energy Conservation, Inc.:
http://peci.org/CxTechnical/Tools_Guides/guides.html
www.peci.org/ftguide/
Commissioning Guides - Energy Design Resources:
www.energydesignresources.com/category/commissioning/
"The Commissioning Process" ASHRAE Guideline 0-2005: ISSN 1049-894X

5. District Cooling 1 point

Intent
A district cooling plant distributes chilled water from a central plant to individual buildings through a network of underground pipes. A single district cooling plant can satisfy the cooling needs of several buildings and customers.

Austin Energy chilled water plants use a combination of Thermal Storage, heat recovery driven Absorption Chillers, or high efficiency electric chillers to reduce electric consumption and peak demand. District cooling contributes to the reduction of conventional power plant construction, associated green house emissions, and building operating costs.

Operational benefits of district cooling are proven reliability, convenience and simplicity and risk mitigation. Building costs are reduced initially by substantially reducing the capital investment for a cooling system. Throughout the life of the building the use of district cooling offers lower operational and energy expenses for the entire facility and stable, predictable cooling costs over the long term which will increase the net operating income. From a logistics standpoint, the use of district cooling will conserve space by eliminating the need for a chiller plant, reduce noise and potential environmental hazards and improve facility comfort.

Any building within a few blocks of existing chilled water should consider district cooling.

Requirements
Tie into an Austin Energy district cooling loop.

Required Documentation
- Drawings demonstrating the tie from the building into an Austin Energy district cooling loop.
- Signed contract with Austin Energy District Cooling.

References
Austin Energy District Cooling Services:
www.austinenergy.com/Commercial/Other%20Services/On-Site%20Energy%20Systems/districtcooling.htm
email: districtenergy@austinenergy.com

W A T E R

Better Water Quality, Water Conservation, Rainwater Catchment

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1. Irrigation Water Minimization **1 - 3 points**

Intent
Minimizing potable water use for landscape irrigation by designing WaterWise landscapes, using drip irrigation and “smart” technology irrigation systems, and utilizing rainwater catchment systems will reduce the load on municipal water systems saving water and energy and lower building operating costs.

Requirements
Irrigation potable water consumption is reduced by at least: 50%, 75%, or 100% of total water required for irrigation.

Required Documentation
- Landscape design drawings indicating areas of the site that will require irrigation.
- Drawings and a narrative describing the captured rainwater system or recycled site water system with the capacity of the system highlighted.
- Drawings and a narrative describing the type of irrigation system.

- Calculations from the AEGB Irrigation Calculator
- Calculations from the AEGB Rainwater & Condensate Calculator

OR

- Design narrative of the landscape design and describe why a permanent landscape irrigation system is not necessary.

Strategies

Potable water used for irrigation can be reduced through a number of methods.

- Retaining existing established plant material on a site will drastically reduce the amount of irrigation required to get new plant material healthily established in the site.
- Minimizing use of manicured grass.
- Landscape design and plant material choices that are appropriate to the climate will reduce the amount of water required by depending more on the natural rain cycles than the irrigation system.
- High-efficiency irrigation systems that include moisture sensors, clock timers and weather data-base controllers are widely available. These "smart" technologies ensure that plant material is being watered only when required and eliminate the waste associated with over-watering.
- Stormwater, rainwater, and condensate collection systems can also be of use in reducing the amount of potable water used for irrigation. This water will not be potable but can be used with no or minimal further treatment for irrigation purposes.

References

Water Conservation Program provides information and assistance – City of Austin:
www.ci.austin.tx.us/watercon/
Landscaping for water quality protection - Grow Green City of Austin:
www.ci.austin.tx.us/growgreen/
Sustainable Building Sourcebook – Austin Energy Green Building:
www.austinenergy.com/Energy%20Efficiency/Programs/Green%20Building/Sourcebook/water.htm
The Irrigation Association:
www.irrigation.org/
Guide to Rainwater Harvesting - Texas Water Development Board:
www.twdb.state.tx.us/iwt/rainwater.asp
Rainwater Harvesting (including calculator) - Texas A & M:
rainwaterharvesting.tamu.edu/why.html
Texas Evapotranspiration:
texaset.tamu.edu/

2. Indoor Potable Water Use Reduction **1 - 4 points**

Intent

High efficiency plumbing fixtures reduce consumption of water for indoor use thus lessening the impact on the water supply and treatment facilities and reducing building operating costs by saving water and associated energy use.

Requirements
Reduce planned indoor potable water consumption below the baseline by 15%, 20%, 25%, or 30%. The volume and flow rates for standard plumbing fixtures used to establish the baseline are set by the current ASME/ANSI Standards and City of Austin Ordinance No. 20071018-086 Section 411.3.1.

Required Documentation
- Calculations from the AEGB Building Water Use Reduction Calculator.
- Plumbing fixtures documentation.
- Projected actual building occupancy and occupancy schedules.

References
Toilet listings and rainwater harvesting - City of Austin Water Conservation:
www.ci.austin.tx.us/watercon/

TYPES OF WATER SAVING FIXTURES			
TOILETS	**URINALS**	**SINKS AND LAVATORIES**	**SHOWERS**
Power-Assisted Low Flush	Waterless	Low-Flow Faucets	Low-Flow Showerheads
Dual Flush	Pint Flush	Electronic Sensor Faucets	
Power-Assisted Dual Flush	Quart Flush		
Composting Toilets			

Energy Star Appliance listings:
www.energystar.gov/index.cfm?c=appliances.pr_appliances
EPA **WaterSense** labeled High Efficiency Toilets and Faucets:
www.epa.gov/watersense

Rainwater and condensate collection systems can also be of use in reducing the amount of potable water used in the plumbing system.

Texas Guide to Rainwater Harvesting:
www.twdb.state.tx.us/assistance/conservation/Alternative_Technologies/Rainwater_Harvesting/Rain.htm

3. Stormwater Management **1 point**

Intent
Increase infiltration of stormwater using innovative water quality controls to reduce the impact of flood, erosion, and water pollution on the environment and properties.

Requirements
Incorporate innovative water quality controls as outlined in ECM 1.6.7 to manage by infiltration a percentage of the water quality volume (WQV), as defined by the calculation in the City of Austin Environmental Criteria Manual (ECM).

OPTION 1 - For sites with at least 50% existing impervious cover
25% of the WQV must be managed by infiltration.

OPTION 2 - For sites with less than 50% existing impervious cover
50% of the WQV must be managed by infiltration.

Required Documentation
- Narrative describing contribution of each BMP (Best Management Practices)
- Calculations of total stormwater run-off from ECM 1.6.2.A

References
City of Austin, Environmental Criteria Manual 1.6.2A and 1.6.7:
www.amlegal.com/austin_nxt2/gateway.dll?f=templates&fn=default.htm&vid=amlegal:austin_environment
"Guidance Specifying Management Measures for Sources of Non-point Pollution in Coastal Waters" - EPA:
www.epa.gov/owow/nps/MMGI/
Strategies and tools to comply with EPA regulations - Stormwater Manager's Resource Center:
www.stormwatercenter.net
Design guide -Texas Guide to Rainwater Harvesting:
www.twdb.state.tx.us/assistance/conservation/Alternative_Technologies/Rainwater_Harvesting/Rain.htm
Low Impact Development design strategies and case studies – Urban Design Tools:
www.lid-stormwater.net/
"Water Quality Management Technical Manual" includes best management practices - LCRA:
www.lcra.org/library/media/public/docs/watershed_TechnicalManual.pdf

INDOOR ENVIRONMENTAL QUALITY

Better Indoor Environmental Quality, Humidity Control, Comfort

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1. Indoor Air Quality Monitoring **1 point**

Intent
Monitor Indoor Air Quality to maintain adequate volume of fresh air within a building by measuring the carbon dioxide concentrations for the health and productivity of the occupants.

Requirements
Install permanent carbon dioxide monitoring system interlocked with the ventilation system.
Commission all systems to the preferred set point parameters and optimal performance for all operating conditions.

Required Documentation
- Drawings and narratives describing the monitoring and control system.
- Monitoring system specifications and cut sheets.
- Documentation of the commissioning efforts associated with the monitoring and control system.

References
Indoor Air Quality guidance tools - EPA:
www.epa.gov/iaq/index.html

2. Indoor Chemical & Pollutant Sources **1 point**

Intent
Minimize contamination of indoor pollutants created by particulate matter generated by certain types of equipment and chemical use inside a building that affect the health, comfort, and performance of occupants.

Requirements
Identify and isolate pollution point sources which may include: copy rooms, print shops, janitorial closets/rooms, laboratories, chemical storage, etc. (Complete all below)

- Provide ventilation directly to the outside of the building.
- Between these areas and occupied spaces construct a full height deck to deck partition or construct a hard lid ceiling enclosure.
- Operate at a negative pressure relative to surrounding areas under all operating conditions by testing.

Required Documentation
- Plans locating copy rooms, print shops, laboratories, and janitorial chemical storage rooms.
- Details and partition schedule indicating types of full height partitions used.

- Mechanical and plumbing construction documents demonstrating ventilation, drainage and pressure requirements.

References
Indoor Air Quality in Large Buildings guidance tool - EPA:
http://www.epa.gov/iaq/largebldgs/i-beam/index.html
Office Equipment: Design, Indoor Air Emissions, and Pollution Prevention Opportunities - EPA:
www.p2pays.org/ref/07/06260.pdf

3. Daylighting **1 point, $**

Intent
Integrate effective daylighting systems, electric lighting systems and controls to optimize daylighting strategies and minimize energy consumption and heat generation.

Requirements
Provide adequate daylighting which minimize glare and integrate daylighting systems with electric lighting systems and controls. Integrated controls are not required for dwelling units.

Required Documentation
- Lighting plan and sections showing daylighting penetration and electrical controls and photoelectric sensors.
- A narrative highlighting the methods used to provide sufficient daylighting for the task, shading strategies, depth of daylight, quality and quantity of daylight, surface colors, contrast ratio < 4:1, percentage of building day lit, and orientation.
- Include in the specifications the requirement for calibration of controls and calibration logs to be submitted by the contractor.

References
Daylighting design guide - U.S. Department of Energy EERE:
www1.eere.energy.gov/buildings/commercial/lighting.html
Daylighting - Whole Building Design Guide:
www.wbdg.org/resources/daylighting.php
Electric Lighting Controls - Whole Building Design Guide:
www.wbdg.org/resources/electriclighting.php

4. Views to Outside **1 point**

Intent
Provide a connection between the indoor and outdoor environments by providing visual access to windows.

Requirements
Glazing systems and interior partitions allow for a minimum of 75% of regularly occupied spaces a view of vision glazing (between 2'-6" and 7'-6" from finished floor height) and a view of the outdoors.

Required Documentation

- Plans and sections demonstrating the lines of site from within the building to the vision glazing.
- View Calculator indicating that areas with uninterrupted views to the outside encompass 75% of regularly occupied space (not including copy rooms, storage areas, mechanical, laundry, bathrooms and other support areas).

References

5. Thermal Comfort **1 point**

Intent
Provide an environment that controls temperature, humidity and air movement for the comfort and performance of the occupants.

Requirements
Install mechanical systems (thermal, ventilation, and dehumidification) and controls to provide thermal comfort for all operating conditions according to ASHRAE 55-2004.

Required Documentation

- Address the Owner Project Requirements for thermal comfort using ASHRAE 55-2004 section 6.1.1 in the Basis of Design and supporting documentation.

References
ASHRAE 55-2004 *Thermal Environmental Conditions for Human Occupancy*: www.ashrae.org/

6. Individual Controllability **1 point**

Intent
Provide a high level of individual environmental control for thermal and air flow systems to support optimum health, productivity, and comfort conditions for the occupants.

Requirements
Install and commission systems for individual occupant controllability for thermal comfort for 75% of the occupants.

Required Documentation

- A narrative describing the individual control system and controls and calculations that show that 75% of the building occupants have individual control.

References
Research and articles on building energy performance - New Buildings Institute: newbuildings.org/
“A Field Study of Personal Environmental Modules Performance”, Bauman, Fred, Center for Environmental Design Research, Berkeley, CA, 1997: cbe.berkeley.edu/research/pdf_files/bauman1998_bofa.pdf

7. Low-Emitting Materials

Intent
Low–emitting building materials reduce toxic pollution and waste thus conserving natural resources and habitats and minimizing global warming and ozone depletion, in addition to contributing to good indoor air quality for the benefit of the health and productivity of building occupants.

7a. Sealants and Adhesives **1 point**

Requirements
All sealants and adhesives applied on-site to building interior meet South Coast Air Quality Management District (SCAQMD) standards Rule 1168. *If a specialty product does not have a low VOC option, contact your AEGB representative for approval prior to application.*

Required Documentation
- Cut sheet and MSDS sheet for each sealant and adhesive with VOC content highlighted.
- Tabulation using the AEGB Low Emitting Materials Form.

References
South Coast Air Quality Management District:
www.aqmd.gov/rules/reg/reg11/r1168.pdf

7b. Flooring System **1 point**

Requirements
All installed carpets meet Carpet & Rug Institute's (CRI) Green Label Plus minimum standards. All installed carpet pads meet CRI Green Label minimum standards. All resilient flooring products, including linoleum, laminate flooring, and rubber flooring are FloorScore™ certified. All engineered wood and laminate flooring contain no added urea-formaldehyde. All flooring systems meet the requirements of SCAQMD Rule 1113 and Rule 1168.

Required Documentation
- Cut sheets for carpets and pads with the VOC limits highlighted.
- Cut sheets for non-carpet flooring with listed FloorScore™ certification.
- Tabulation using the AEGB Low Emitting Materials Form.

References
Green Label Plus approved products - Carpet & Rug Institute:
www.carpet-rug.org/drill_down_2.cfm?page=8&sub=17&requesttimeout=350
Certified hard flooring products – FloorScore™:
www.scscertified.com/iaq/floorscore_1.html

7c. Composite Wood and Agrifiber Products **1 point**

Requirements
All installed composite wood and agrifiber products shall contain no added urea-formaldehyde.

Composite wood and agrifiber products are defined as: particleboard, medium density fiberboard (MDF), wheatboard, strawboard, panel substrates, door cores, and plywood.

Required Documentation
- MSDS for composite wood and agrifiber products with urea-formaldehyde levels highlighted.
- Tabulation using the AEGB Low Emitting Materials Form.

References
"Particleboard and Medium Density Fiberboard" recommendations - Green Seal:
www.greenseal.org/resources/reports/CGR_particleboard.pdf

7d. Insulation **1 point**

Requirements
All installed insulation (excluding piping) contains no added urea-formaldehyde.

Required Documentation
- MSDS for insulation with urea-formaldehyde levels highlighted.
- Tabulation using the AEGB Low Emitting Materials Form.

References
Greenguard IAQ Certified Products® - Greenguard:
http://www.greenguard.org/
Products meeting CHPS Low-Emitting Materials criteria - Collaborative for High Performance Schools (CHPS):
www.chps.net/manual/lem_table.htm

8. Moisture Protection **1 point**

Intent
Protect against building moisture infiltration through direct rainwater intrusion, water vapor transmission, and negative pressurization. Avoid potentially damaging results of condensation that may occur within an exterior wall system. This affects the health of the occupants, air conditioning costs, and building integrity and durability.

Requirements

No vinyl wall coverings or other vapor barriers, such as fiber reinforced plastic or vinyl (FRP or FRV), are to be installed as the finish material on the interior of any exterior wall.
Tenant agreements state that no vinyl wall coverings or other vapor barriers may be installed as the finish material on the interior of any exterior wall.
Install building envelope drainage plane systems, including flashing and overhang systems.
Document building will be pressurized.

Required Documentation

- Wall sections for each exterior wall type indicating all materials, thermal characteristics, and permeability. Provide a temperature gradient for each wall section for heating, cooling, and dew point design conditions.
- Typical building details of building envelope drainage systems, including flashing and overhang systems.
- Narrative describing rain or bulk water drainage plane performance.
- Copy of tenant agreement, if applicable.
- Building Pressurization Schedule and Schematic.
- BOD includes language describing building pressurization under all operating conditions.

References
ASHRAE's Handbook – Fundamentals
www.ashrae.org/

9. Acoustic Quality **1 point**

Intent
To provide a building environment free from disturbing mechanical equipment noise and vibration and excessive sound reverberation and designed with sufficient acoustical privacy and adequate sound isolation. To minimize tonal noise and intermittent noise sources in occupied spaces, as these noise sources are particularly troublesome.

Requirements

- Define appropriate background sound levels, reverberation decay times, speech intelligibility, and sound isolation for the building use. Identify spaces where impact noises are likely and address the potential problem.
- Provide mechanical and duct systems designed to meet guideline RC, NC or NCB provided by current copy of ASHRAE Applications Design Guidelines for HVAC Sound and Vibration Control Chapter.
- Provide appropriate vibration isolation for mounted equipment.
- Select equipment that could not be characterized as "tonal".
- Specify surface finishes and/or masking systems to provide appropriate sound intelligibility and privacy.
- Specify partitions, ceilings, floor/ceiling assemblies, building layouts, and vestibules to provide adequate sound isolation between spaces.
- Mitigate intermittent noise sources such as footfall and loading dock noise.

Required Documentation

- Narrative of the acoustical Owner Project Requirements and Basis of Design.
- One third octave band sound data submittals (or a narrative to address tonality) for the following:
  - air handling equipment inlets, discharges, and casing radiation
  - exhaust fan bare fan sound levels
  - generators
  - pumps
  - chillers
- Vibration isolation schedule.
- Surface finish schedules including NRC and CAC Ratings as applicable.
- Schedule of partition and floor/ceiling assembly cross sections. Indicate STC, CAC and IIC ratings of partitions, ceilings and floor/ceilings on plans.

References
"A Practical Guide to Noise and Vibration Control for HVAC Systems" and "Applications of Manufacturers Sound Data" by Mark E. Schaffer
Acoustics.com – acoustic considerations and strategies
www.acoustics.com/
Acoustical Society of America Store
asastore.aip.org/

10. Outdoor Pollutant Control **1 point**

Intent
Avoid exposure of building occupants to potentially hazardous particulates and chemical pollutants (vehicle exhaust, natural pollens/allergens, biological pollutants, etc.) that can enter the building through air intakes and entryways.

Requirements
Entrances, operable windows and fresh air intakes shall be located a minimum 30 feet away from designated smoking areas and air intakes shall meet the minimum separation distance requirements of ASHRAE STD. 62.1-2004, Table 5-1. Install appropriate signage to clearly designate where smoking is permitted and not permitted.

Install permanent entryway systems (grills, grates, mats), a minimum 6 feet long (10 feet recommended), in the primary direction of travel to capture dirt from entryways directly connected to the outdoors.

Mitigate air borne contaminates from outdoor air pollutant sources.

Required Documentation
- Plans indicating the location of the smoking sections, the 30 foot radius around the areas and all entrances, operable windows and air intakes.
- Signage plans denoting smoking and no smoking areas.
- Entrance plans, details and cut sheets describing the entryway system.
- Narrative identifying outdoor air pollutant sources in accordance with ASHRAE STD. 62.1-2004, Sections 4.1, 4.2, and 4.3.
- Narrative of design strategies to mitigate air borne contaminates from the outdoors.

References
City of Austin Smoking in Public Places Ordinance:
www.amlegal.com/austin_nxt/gateway.dll/Texas/austin/title10publichealthservicesandsanitation/chapter10-6smokinginpublicplaces?f=templates$fn=altmain-nf.htm$3.0#JD_10-6-8
IAQ Design Tools for Schools Graphic - U.S. EPA:
www.epa.gov/iaq/schooldesign/controlling.html
Fundamentals of IAQ in Buildings - U.S. EPA – I-BEAM Text Modules:
http://www.epa.gov/iaq/largebldgs/i-beam/text/

11. Construction Indoor Air Quality **1 point**

Intent
Prevent indoor air quality problems that result from the construction process.

Requirements
Develop and implement a Construction Indoor Air Quality Management Plan that meets or exceeds the recommended control measures of the Sheet Metal and Air Conditioning National Contractor's Association (SMACNA) *IAQ Guidelines for Occupied Buildings Under Construction*. The plan should include each of these key areas of IAQ protection: Scheduling, Source Control, HVAC Protection, Pathway Interruption, and Housekeeping.

Protect stored on-site or installed absorptive materials from moisture damage.

If permanently installed air handlers are used during construction, filtration media with a minimum MERV of 8 shall be used at each return grille. Replace all media filters immediately prior to occupancy.

Required Documentation
- Copy of the Construction IAQ Management Plan, highlighting the five requirements of the SMACNA *IAQ Guidelines for Occupied Buildings Under Construction*
- Photographs of on-site construction IAQ measures, such as duct protection and on-site storage of absorptive materials.
- Cut sheets of filtration media used during construction with MERV values highlighted.

References
IAQ Guidelines for Occupied Buildings Under Construction - Sheet Metal and Air Conditioning National Contractor's Association:
www.smacna.org/bookstore/

M A T E R I A L S & R E S O U R C E S

Sustainable Material Choices, Use and Disposal

1. Additional Construction Waste Management 1 point

Intent
Divert construction, demolition, and land clearing debris from landfill disposal. Redirect recyclable material back to the manufacturing process.

Requirements
Recycle and/or salvage at least 75% (by weight) of non-hazardous construction and demolition waste excluding excavated soil and stone.

The following table shall be used to calculate percentage of construction waste diverted when weight tickets are not available:

SOLID WASTE CONVERSION FACTORS	
MATERIAL	DENSITY, (lbs/CY)
Mixed Waste	350
Wood	300
Cardboard	100
Gypsum Wallboard	500
Rubble	1400
Steel	1000

Required Documentation
- Specifications for Construction Waste Management in the Contract Documents.
- Construction Waste Management Plan and copies of weight tickets for recycling, salvage and landfill.
- Completed AEGB Construction Waste Management Calculator.

References
The Waste Reduction Assistance Program is available to assist with all aspects of solid and hazardous waste management through the on-site waste reduction assessment service, materials exchange, and business information-clearing house. Have a waste reduction assessment conducted for facility operation; contact City of Austin Solid Waste Services Waste Reduction Assistance Program at 974-9043.
www.ci.austin.tx.us/sws/wrap_assessment.htm

Sustainable Building Sourcebook – Austin Energy Green Building:
www.austinenergy.com/Energy%20Efficiency/Programs/Green%20Building/Sourcebook/constructionWasteManagement.htm

2. Building Reuse

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

2a. Envelope and Structure **1 - 2 points**

Requirements
Incorporate at least 40% or 80% (surface area) of existing building envelope (including exterior skin and framing, excluding window assemblies and non-structural roofing material) and structure (including structural floor and roof decking) in the new building.

Required Documentation
- Plans and elevations indicating pre-construction existing building shell and structure and intended area to be preserved.
- Calculations from the AEGB Building Reuse Calculator.

References
Building Reuse Case Studies - Smart Growth Network:
www.smartgrowth.org/library/bytype.asp?typ=2

2b. Interior Non-Structural Elements **1 point**

Requirements
Incorporate at least 50% (surface area) of existing interior non-structural elements (walls, doors, floor coverings and ceiling surfaces) in the new building.

Required Documentation
- Plans and elevations indicating pre-construction existing building interior elements and intended areas to be reused.
- Calculations from the AEGB Building Reuse Calculator.

References

3. Salvaged Materials **1 - 2 points**

Intent
Extend the life cycle of targeted building materials by reducing environmental impacts related to materials manufacturing and transport.

Requirements
Salvaged or refurbished materials account for 5% or 10% (dollar value) of total project building materials cost.

Mechanical, electrical and plumbing components as well as specialty items should not be included in the calculations. Only include materials permanently installed in the project.

Required Documentation
- Calculations from the AEGB Building Materials Calculator.

References
Salvaged Building Materials Business Directory - Building Materials Reuse Association
http://ubma.org/
ReStore Salvaged Building Materials Outlet - Austin Habitat for Humanity
www.re-store.com/

4. Recycled Content **1 - 2 points**

Intent
Increase demand for building products that have incorporated recycled content materials, therefore reducing the impacts resulting from the extraction of new materials.

Requirements
Building materials contain recycled content (the sum of post-consumer recycled content plus one-half of the pre-consumer content) of at least 10% or 20% (dollar value) of total project building materials cost.

Mechanical, electrical and plumbing components as well as specialty items should not be included in the calculations. Only include materials permanently installed in the project.

Required Documentation
- Calculations from the AEGB Building Materials Calculator.

References
EPA Comprehensive Procurement Guidelines:
www.epa.gov/cpg/
Recycled Content Product Database – California Integrated Waste Management Board:
www.ciwmb.ca.gov/rcp/
Recycled Content Product Database from Texas Manufacturers - Clean Texas:
www.cleantexas.org/index.cfm?fuseaction=public.resources_texasrecycle

5. Texas Sourced Materials **1 - 2 points**

Intent
Increase demand for materials that are manufactured in Texas, thereby reducing the environmental impacts resulting from their transportation and supporting the State economy.

Requirements
Building materials and products are extracted and/or manufactured (final assembly) regionally within Texas for at least 30% or 50% (dollar value) of the project materials cost.

Mechanical, electrical and plumbing components as well as specialty items should not be included in the calculations. Only include materials permanently installed in the project.

Required Documentation
- Calculations from the AEGB Building Materials Calculator.

References
Recycled Content Product Database from Texas Manufacturers - Clean Texas:
www.cleantexas.org/index.cfm?fuseaction=public.resources_texasrecycle
Sustainable Building Sourcebook – Austin Energy Green Building:
www.austinenergy.com/Energy%20Efficiency/Programs/Green%20Building/Sourcebook/materials.htm

6. Certified Wood **1 point**

Intent
Encourage environmentally responsible forest management.

Requirements
At least 50% (dollar value) of new wood-based materials are certified in accordance with the Forest Stewardship Council (FSC) guidelines for wood building components.

Required Documentation
- Calculations from the AEGB Certified Wood Calculator.

References
FSC Certified Products Database - Certification Research Center:
www.certifiedwoodsearch.org
Forest Stewardship Council:
www.fsc.org

7. Low VOC Paints, Coatings, Adhesives, and Sealants **1 point**

Intent
Reduce the quantity of air contaminants that are odorous or potentially irritating to installer and occupant health and comfort.

Requirements
All paints, primers, and anti-corrosive coatings applied on-site to the building exterior must not exceed the VOC limit of Green Seal standard GS-11 as shown below. All coatings, adhesives, and sealants applied on-site to the building exterior must not exceed the current VOC limit of South Coast Air Quality Management District

(SCAQMD) Rule 1113 and Rule 1168. *If a specialty product does not have a low VOC option, contact your AEGB representative for approval prior to application.*

Paint Type	VOC Limit (g/L)*
Non-flat Topcoat	100
Flat Topcoat	50
Primer	100
Anti-Corrosive Coating	250

* The calculation of VOC shall exclude water and colorants added at the point-of-sale.

Required Documentation

- Tabulation using the AEGB Low Emitting Materials Form
- Product specifications and submittals

References

Green Seal GS-11– Paints and Coatings, 2nd Edition May 12, 2008:
http://www.greenseal.org/certification/standards/paints_and_coatings.pdf
SCAQMD Rule 1113 – Coatings:
www.aqmd.gov/rules/reg/reg11/r1113.pdf
SCAQMD Rule 1168 –Adhesives and Sealants:
www.aqmd.gov/rules/reg/reg11/r1168.pdf

E D U C A T I O N
Environmental Awareness and Contribution

1. Educational Outreach 1 point

Intent
Provide public education highlighting the green building strategies implemented in this project. A green building can be an effective educational tool and can have a significant impact on the users' (occupants and visitors) understanding of the built and natural environment.

Requirements
Provide at least 2 Educational Services to include:

- A comprehensive signage program built into the building and site to educate the occupants and visitors on the benefits of green building. This program may include windows to view energy saving mechanical equipment and signs to call attention to water conserving plumbing fixtures or landscape features.
- A case study to showcase the green building strategies implemented to educate design professionals and general public. This case study may be published online at www.austinenergy.com at the discretion of AEGB.
- An educational outreach program to educate the community on sustainable living using this project as an example. This program may include guided tours of the facility, pamphlets, and display boards highlighting the sustainable features.

Required Documentation

- Narrative describing the signage program. Include design drawings of the educational displays and locations within the building and site.
- Case Study using the AEGB Commercial Program Case Study Form or similar.
- Narrative describing the educational outreach program including the content and means of implementation.

References
Case Study Form – AEGB Commercial Program
www.austinenergy.com/Energy%20Efficiency/Programs/Green%20Building/Resources/Case%20Studies/CommCaseStudy.rtf
Case Studies – AEGB
http://www.austinenergy.com/Energy%20Efficiency/Programs/Green%20Building/Resources/Case%20Studies/index.htm

I N N O V A T I O N
Creative, New Sustainable Solutions

1 - 5 points

Intent
Develop sustainable solutions that demonstrate a comprehensive approach and quantifiable environmental and /or health benefits beyond the requirements of measures defined in this program.

Requirements
Submit a proposal of the innovation measure to Austin Energy Green Building for approval. Include the intent of the measure, requirements for compliance, documentation to demonstrate compliance, and the design approach (strategies) that will be used to meet the requirements. One point may be earned for each Innovation measure; a maximum of five Innovation measures are possible.

Required Documentation
- A narrative meeting the requirements listed above.

References

Appendix: General Green Building Resources

Austin Energy, Commercial Programs and Rebates $:
www.austinenergy.com/Commercial/index.htm
www.austinenergy.com/Energy%20Efficiency/Programs/Rebates/Commercial/

Energy Improvement and Extension Act of 2008 Summary including energy efficiency tax incentives for: commercial buildings, combined heat and power systems (CHP) and for plug-in hybrid purchases
www.finance.senate.gov/sitepages/leg/LEG%202008/091708%20Staff%20Summary%20of%20the%20Energy%20Improvement%20and%20Extension%20Act.pdf

IRS publications:
- *Energy Savings Modeling and Inspection Guidelines for Commercial Building Federal Tax Deductions*, 2nd edition, May 2007.
www.nrel.gov/docs/fy07osti/40467.pdf
- Notice 2006-52: *Deduction for Energy Efficient Commercial Buildings:*
www.irs.gov/pub/irs-drop/n-06-52.pdf

Austin Energy Green Building:
www.austinenergy.com/go/greenbuilding

Austin Energy Green Building, *Sustainable Building Sourcebook*:
www.austinenergy.com/Energy%20Efficiency/Programs/Green%20Building/Sourcebook/index.htm

Austin Environmental Directory. Paul Robbins, editor. 2006 edition:
A sourcebook for environmental issues, products, services, and organizations in the Austin area
www.environmentaldirectory.info/Austin/

Austin Water Utility, Commercial Programs, Rebates $, and *Water Efficient Equipment and Design*:
www.ci.austin.tx.us/watercon/default.htm
www.ci.austin.tx.us/watercon/downloads/EquipmentGuide.pdf

BuildingGreen, LLC:
www.buildinggreen.com
BuildingGreen publishes accurate, unbiased, and timely green design information through many publications, including Environmental Building News, the GreenSpec directory of green products, and the BuildingGreen Suite of online tools.

Business Energy Advisor, Austin Energy and ESource:
The Business Energy Advisor provides detailed information on energy consumption for 10 market sectors, O & M best practices, and buyer's guides for energy efficient technologies.
http://www.austinenergy.com/Energy%20Efficiency/Tools%20and%20Tips/Commercial/energyAdvisor.htm.

Center for Maximum Potential Building Systems:
www.cmpbs.org/

Energy Design Resources:
www.energydesignresources.com
Energy Design Resources offers a valuable palette of energy design tools and resources that help make it easier to design and build energy-efficient commercial and industrial buildings in California. The goal of this effort is to educate architects, engineers, lighting designers, and developers about techniques and technologies that contribute to energy efficient nonresidential new construction.

Environmental Building News and *GreenSpec® Guide*:
www.buildinggreen.com/
www.buildinggreen.com/ecommerce/gbp.cfm?

Green Building Pages – building materials database and design tool:
www.greenbuildingpages.com

Green Building Resource Guide:
www.greenguide.com

Healthy Building Network – advocates healthier building materials:
www.healthybuilding.net/

Lawrence Berkeley National Laboratory, *The Cost-Effectiveness of Commercial-Buildings Commissioning:*
eetd.lbl.gov/Emills/PUBS/Cx-Costs-Benefits.html

New Buildings Institute:
newbuildings.org/

Rocky Mountain Institute:
www.rmi.org/

Smart Growth Network:
www.smartgrowth.org

Sustainable Building Sourcebook:
www.greenbuilder.com/sourcebook/

Sustainable Design Resource Guide of Colorado:
www.aiasdrg.org

U.S. Department of Energy, Building Technologies Program Building Database: Case studies of various building types around the world with information on green building features, financial analysis, and lessons learned:
http://www.eere.energy.gov/buildings/database/partnering.cfm

U.S. Green Building Council:
www.usgbc.org/

Texas Organizations

Austin Sustainable Building Coalition:
www.greenbuilder.com/sbc/

Infinite Power of TX – technology/concept fact sheets:
www.infinitepower.org

Solar Austin – advocacy group:
www.solaraustin.org/

TREIA (TX Renewable Energy Industries Assoc.):
www.treia.org

TXSES (TX Solar Energy Society):
www.txses.org