



**Green Built Texas Protocol Version 1.0  
Project Summary and Checklist, Multifamily**

**Addition**

**Note: Commercial Checklist must be used for all common areas, other occupancies, and the site**

Summary							
Date of Application							
Compliance Path							
Project Identification							
Project Address							
Owner Identification							
Architect Identification							
Contractor Identification							
Third Party Provider						Provider No.	
Building Code	IBC Residential Occupancy						
Type of Building				IBC Group R Occupancy: (circle one) R-1. R-2. R-3. R-4		Multifamily	
Stories and Type	Number of Stories:	Unit Type: 1 bed/1 bath	Unit Type: 2 bed/1 bath	Unit Type: 2 bed/2 bath	Unit Type: 3 bed/2 bath	Unit Type: 3 bed/3 bath	Unit Type: Other
Garage	Attached	Detached	Carport	None			
Building Sq. Footage	Lot Size:		Building Total Sq. Ft:		Area Under Roof:	Total Nonroof Area:	
IECC Climate Zone	2A						
Green Built Texas Protocol	All requirements mandatory as applicable						
<b>Note: Buildings shall be designed and constructed in accordance with the Energy provisions of Dallas Energy code. Compliance with IECC must be demonstrated separately by City of Dallas registered Third Party Energy Inspector</b>							



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Item	Protocol Element	Plan Review		Inspection			Field Notes	Comments
		Yes	No	Yes	No	N/A		
<b>Site Management and Preparation</b>								
1	<ul style="list-style-type: none"> <li>Implement an erosion control plan, developed by an authorized professional, that identifies the following:               <ul style="list-style-type: none"> <li>Boundaries of the project site.</li> <li>Details on best management practices (BMPs) required to protect all existing and planned storm sewer system inlets and outfalls that will require erosion control.</li> <li>Details on best management practices (BMPs) required to protect site boundaries subject to water runoff and identify location(s) of BMPs at construction entrance and concrete washout area to prevent erosion and storm water pollution.</li> </ul> </li> </ul>							
2	Install and maintain erosion control measures on any area disturbed on the site until permanent vegetation has been reestablished in these areas. Projects required to obtain a TCEQ storm water permit may submit the site's Storm Water Pollution Prevention Plan (SWPPP) as evidence of compliance.							Copy of TCEQ Storm water permit and documentation
3	Provide a Geotechnical / subsurface soils investigation for the site.							
4	Implement a tree protection plan or fully comply with established local ordinance regarding tree protection.							Visually verify during construction Copy of protection plan
5	Preserve and protect existing trees and plants adjacent to the construction site.							
6	(Optional Consideration) Use bioswales to remove silt and pollution from surface runoff water.							
	<b>Waste reduction strategies:</b> Choose at least two of the following strategies							Requires letter from contractor attesting to compliance with selected strategies
	Choose at least two of the following strategies							
	<b>Strategy 1:</b> Reuse form board on slabs and flatwork							
	<b>Strategy 2:</b> Optimize building dimensions to correspond to standard lumber dimensions							
	<b>Strategy 3:</b> Develop detailed framing layouts to avoid waste when ordering lumber							



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	<b>Strategy 4:</b> Set aside lumber and plywood/OSB cutoffs that can be used later as fire blocking, spacers in header construction, etc.							
	<b>Strategy 5:</b> Use larger pieces of leftover lumber ( 6 ft or more in length) for other jobs.							
	<b>Strategy 6:</b> Order drywall in optimal dimensions to minimize cut off waste							
	<b>Strategy 7:</b> Set large drywall scraps aside during hanging for use as filler pieces in areas such as closets							
	<b>Strategy 8:</b> Estimate masonry material needs carefully to avoid waste							
	<b>Strategy 9:</b> Salvage usable bricks, blocks, slate shingles, tile and masonry materials from remodeling and construction. Store for future jobs or divert to salvage operations							Copy of waste recycling plan at permit review
	<b>Strategy 10:</b> Implement on site grinding of wood waste for reuse.							
<b>Water Efficiency</b>								
1	Locate water heater within 30 ft. of fixtures in at least 75% of project units, or install hot water on demand system, or install parallel piping system that originates from a central manifold (i.e. PEX Home-Run).							Visually inspect during construction and post construction
2	Install an ENERGY STAR dishwasher in each unit.							
3	Install rain and freeze sensors on sprinkler system or weather forecast based (ET) irrigation controller.							
4	Limit 90% of turf plantings to drought-tolerant varieties that can be expected to survive stage 3 drought restrictions.							Visually inspect <u>Acceptable turf varieties include:</u> Bermuda, Big Blue Stem, Blue Grama, Buffalo grass, Deer Lindheimer Muhly, Little Blue Stem, Prairie Dropseed, Sideoats Grama, Switch Grass Muhly and Indian Grass.
5	Limit 75% of shrub and tree plantings to those that are deemed regionally appropriate by a horticultural authority such as the Texas A&M Horticulture Department.							See the Urban Landscape Guide list by region at <a href="http://aggie-horticulture.tamu.edu/earthkind/plantselector/">http://aggie-horticulture.tamu.edu/earthkind/plantselector/</a>



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6	Provide a written irrigation watering plan by controller and by zone. Plan shall include total estimated annual water consumption for the total stabilized landscape and estimated water consumption during construction. Plan should follow required jurisdictional irrigation restrictions, typical controller settings by zone, and appropriate planting (tree, turf, and shrub) type, soil type and gradient slope to mitigate runoff.							Supporting documentation Indicate controller system
7	Install 2 inch deep mulch in landscape beds							Visually inspect
8	Zone irrigation system separately for trees, turf and slab/bedding areas.							
	<b>Select any one (1) of the following water conservation strategies or install rainwater catchment system to provide for a minimum of 50% of landscape irrigation needs:</b>							
	<b>Strategy 1:</b> Select high performance fixtures. Choose any 2 of the following							Visual inspection required Submit supporting documentation
	<ul style="list-style-type: none"> <li>▪ All lavatory faucets rated at less than or equal to 2.0 gpm.</li> </ul>							
	<ul style="list-style-type: none"> <li>▪ All kitchen &amp; utility faucets rated at equal to or less than 2.2 gpm.</li> </ul>							
	<ul style="list-style-type: none"> <li>▪ All showerheads rated at less than 2.5 gpm.</li> </ul>							
	<b>Strategy 2:</b> Select water efficient (at least 1.6 gpf) toilets that work with first flush (min. 350 grams).							Visual inspection required Submit supporting documentation
	<b>Strategy 3:</b> Install a water-conserving, irrigation system. Choose any three (3) of the following strategies or install rainwater catchment system to provide for a minimum of 50% of landscape irrigation needs:							Visually inspect Supporting documentation
	<ul style="list-style-type: none"> <li>▪ Drip irrigation for shrub beds or for areas within six feet of pavements</li> </ul>							
	<ul style="list-style-type: none"> <li>▪ Bubblers</li> </ul>							
	<ul style="list-style-type: none"> <li>▪ Drip emitters</li> </ul>							
	<ul style="list-style-type: none"> <li>▪ Soaker hose</li> </ul>							
	<ul style="list-style-type: none"> <li>▪ Subsurface irrigation</li> </ul>							
	<ul style="list-style-type: none"> <li>▪ Use no irrigation system</li> </ul>							



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	<ul style="list-style-type: none"> <li>Sprinklers heads with 4-inch or greater pop-up height and matched precipitation rate (MPR) nozzles</li> <li>Check valves to prevent drainage from pipes</li> </ul>							
<b>Indoor Air Quality</b>								
1	Perform load calculation based on actual unit design, specifications and orientation and ensure that installed equipment matches Manual J calculations (or approved software). Verify proper refrigerant level and HVAC commissioning per manufacturer's specifications. Maintain documentation, including HVAC loads, equipment selections and charging (commissioning), through warranty period.							<p>Programs that can be used include: ACCA Manual J (8th Version), Carrier HAP Program, Trane Trace 700 or approved equivalent.</p> <p>Submit design load calculations and report documentation</p> <p>Visually inspect</p>
2	Seal ducts during construction at vent entry and exit							Visually inspect during construction
3	Install continuous drainage plane on exterior walls behind cladding material							Visually inspect during construction
4	No vapor barrier on inside of exterior walls							Visually inspect during construction
5	Ensure proper flashing at windows and doors.							Review drawings, specifications Visually inspect during construction
6	Avoid attached garage or isolate garage from the living space by providing a tightly sealed, gasketed door between the garage and conditioned space and provide a continuous air barrier between walls and ceilings separating the garage from the conditioned living space.							Review drawing details Visually inspect
7	Provide combustion air for wood-burning fireplaces from outside.							Visually inspect during construction
8	Use no fiberglass duct board unless sealed properly with low toxic mastic.							Visually inspect during construction
9	No wall-to-wall carpet in the bathroom.							
10	Install vapor barrier under slab.							
11	Install one hardwired carbon monoxide (CO) detector, compliant with NFPA Standard 720, per unit if units have attached garages or are equipped with gas fired equipment.							Visually inspect during construction
12	Install kitchen range hood (at least 100 CFM) to vent range to the outside if range hood location is greater than 25 feet from the closest exterior opening.							Visually inspect during construction



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	<b>Select any two (2) of the following strategies to enhance indoor air quality:</b>							Visually inspect
	<b>Strategy #1:</b> Select carpets, that are compliant with emission levels in accordance with the Carpet and Rug Institute's (CRI) Green Label or Green Label Plus indoor air quality program.							Supporting documentation
	<b>Strategy #2:</b> Use zero-VOC architectural coatings as determined by EPA Method 24 (VOC content below the detection limit for the method).							Supporting documentation
	<b>Strategy #3:</b> Use low-VOC adhesives and sealants.							Review drawings, visually inspect
	<b>Strategy #4:</b> Install capillary break under bottom plate of exterior walls.							Review drawings, Supporting documentation. Visually inspect
	<b>Strategy #5:</b> Install one hardwired carbon monoxide (CO) detector, compliant with NFPA Standard 720, per unit where this is not required by Item #11.							Supporting documentation Visually inspect during construction to extent possible
	<b>Strategy #6:</b> Install bath fans that are rated at 50 CFM per bathroom and equipped with dedicated wall switch, timer and humidistat. Fan must meet ENERGY STAR performance specifications.							Supporting documentation Visually inspect
	<b>Strategy #7:</b> Bath fan and vent must meet the requirements of ASHRAE 62.2 table 7.1.							Supporting documentation Visually inspect
	<b>Strategy #8:</b> Install kitchen and bath vanity cabinets that contain reduced levels of formaldehyde							Supporting documentation Visually inspect
	<b>Strategy #9:</b> Install glass door on wood-burning fireplace.							Supporting documentation
	<b>Strategy #10:</b> Prohibit smoking in common areas. Signage must be displayed in all common areas.							Review drawings Visually inspect
	<b>Strategy #11:</b> Install return air ducts, jump ducts, or transfer grills in all bedrooms or test master bedroom to 0.3 Pascals of pressure at 25 CFM (of each duct type).							Supporting documentation Visually inspect



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<b>Energy Efficiency</b>								
	<b><u>Insulation:</u></b>							Supporting documentation Visually inspect
1	Deliver insulation to the job site in wrapped packages and store in a dry location. Remove and replace any insulation materials that get wet.							
2	Install insulation to meet or exceed Grade 2 performance as outlined by RESNET Guidelines.							
3	Seal (poly seal, if appropriate) all penetrations through exterior walls or plates.							
	<b><u>Soffit and Roof Venting</u></b>							
1	Install soffit vents with “vent tubes” or baffles having sufficient length to extend above the attic insulation.							
2	Roof vents to be installed water tight and according to manufacturer’s written instructions.							
3	(Optional Consideration) Use ridge vents							
	<b><u>Tenant Areas</u></b>							Supporting documentation Visually inspect
1	Install an ENERGY STAR dishwasher and refrigerator.							
2	Ducts in the attic must be a minimum of R-8.							
3	Install ceiling fans that meet or exceed ENERGY STAR specifications (listed in table below). Please note that both minimum airflow and efficiency requirements must be met for all three speeds for acceptability. <b>Fan Speed    Min.Airflow    Efficiency requirement</b> Low            1,250 CFM        155 CFM/watt Medium        3,000 CFM        100 CFM/watt High            5,000 CFM        75 CFM/watt							
4	(Optional Consideration) Use alternative refrigerant (R 410A)							
	<b><u>Common Areas</u></b>							
1	Install ENERGY STAR light fixtures or CFL bulbs in 60% of common area fixtures							



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		Yes	N/A	Yes	No	N/A		
	<b>Provisions Specific to Low-Rise Multifamily:</b> (As defined by IECC)							
	Compliance with the energy aspects of this section must be performed by a RESNET Approved Energy Rating Company or engineering firm. Energy Rating Company, in conjunction with an approved Green Built Texas Verifier, must affirm compliance with the provisions of this protocol.							
	For commercial space separately developed within the project, GBT proposes that builder developer propose an envelope finish specification equal to or superior to the balance the balance of the building. The building should encourage green elements for the tenant finish out but GBT recognizes that the building financing and / or the contract documents may specifically prohibit control of the build out space.							
	<b>Performance Path:</b> Compliance for energy efficiency in Low-Rise projects will meet or exceed at least one (1) of the following performance requirements:							Supporting documentation
	a. Achieve ENERGY STAR Version 2.5 certification as described in the ENERGY STAR Guidelines for Attached Housing, ENERGY STAR Builder Option Package, or							
	b. Achieve HERS Index of 75 or below (as proven by RemRate software supporting ENERGY STAR <b>Version 2.0</b> ) and obtain compliance with Chapters 3 and 5 of the ENERGY STAR Version 3.0 Thermal Enclosure System Checklist, or							
	c. Achieve compliance with an Investor-owned utility (i.e. Oncor, Centerpoint, etc.) "Above Energy Code" Program if different from ENERGY STAR							





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		Yes	No	Yes	No	N/A		
	<b>Provisions Specific to Mid-Rise Multifamily:</b> (As defined by IECC)							
	Compliance with the energy aspects of this section must be performed by a RESNET Approved Energy Rating Company or engineering firm. Energy Rating Company, in conjunction with an approved Green Built Texas Verifier, must affirm compliance with the provisions of this protocol.							
	For commercial space separately developed within the project, GBT proposes that builder developer propose an envelope finish specification equal to or superior to the balance the balance of the building. The building should encourage green elements for the tenant finish out but GBT recognizes that the building financing and / or the contract documents may specifically prohibit control of the build out space							
	<b>Performance Path:</b> For the purposes of this pilot project, compliance for energy efficiency in Mid-Rise projects will meet or exceed performance of at least <b>14%</b> better than base energy code using ASHRAE Standard 90.1 (2004) or comply with ENERGY STAR standards for low or high rise projects using REM/Rate software or approved equal for projects up to five (5) stories.							Supporting documentation
	<b>Prescriptive Path:</b> In lieu of Provision #1 of the Performance Path, builder developer may choose one of the following prescriptive paths to performance.							Supporting documentation Visually inspect
	Required testing for All Prescriptive Options shall include:							
	<ul style="list-style-type: none"> <li>CFM flow analysis for each unit type</li> <li>Must model to ASHRAE 90.1 by the end of the project and report percentage greater than code performance achievement back to task force. No percentage score above code is required for the pilot.</li> </ul>							



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	<b>Prescriptive Option 1:</b> <ul style="list-style-type: none"> <li>HVAC 14 SEER</li> <li>Attic R-38 insulation</li> <li>Window U .5, SHGC .25, SC .28</li> <li>Walls: R-13</li> <li>R410A HVAC refrigerant. This refrigerant is a NON CFC refrigerant that does not contribute to ozone depletion</li> <li>Unit tightness of at least .35 or 6 ACH 50</li> <li>Ducts sealed and tested to ≤ 6 cfm to outdoors / 100 sq. ft. of conditioned floor area.</li> </ul>							
	<b>Prescriptive Option 2:</b> <ul style="list-style-type: none"> <li>13 SEER Heat Pump</li> <li>Minimum R13 Wall Insulation</li> <li>Minimum R-30 Attic Insulation</li> <li>Windows .52 R value/.35 SHGC</li> <li>At least 5 Energy Star lights and/or appliances and one (1) of the following:               <ul style="list-style-type: none"> <li>Programmable thermostat</li> <li>R-38 Upgrade to Attic Insulation</li> <li>Radiant barrier</li> <li>R-15 Upgrade to Wall Insulation</li> <li>R410A</li> </ul> </li> </ul>							
	<ul style="list-style-type: none"> <li>Unit tightness at least .35 or 6 ACH 50</li> <li>Ducts sealed and tested to ≤ 6 cfm to outdoors / 100 sq. ft. of conditioned floor area.</li> </ul>							
<b>Materials</b>								
	<b>Frame Materials:</b>							Supporting documentation
1	Use engineered lumber products to maximum extent possible, based on the project's objectives, to include trusses, joists and finger-jointed dimensional lumber.							
2	Install exterior cladding materials with minimum 10-year warranty.							
3	Keep stored materials elevated above the ground.							



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4	(Optional Consideration) Provide proper drainage around materials as well as adequate air circulation and ventilation to keep materials dry.							
5	(Optional Consideration) Stack and move forward all loose and usable frame material after completion of each framed building.							
	<b>Advanced Framing Techniques:</b> Choose any 2 of the following techniques or use advanced wall systems such as SIPs OR ICF:							Supporting documentation
1	19.2-inch or 24-inch on-center framing for floor system and/or load bearing walls.							
2	24-inch on-center framing for roof systems and/or interior partitions.							
3	Single top plate walls							
4	Steel framing as long as thermal bridging is mitigated by foam core panels on the outside or blown in foam insulation that covers the studs.							
5	Right-sized headers or insulated (box) headers (where required).							
6	Eliminate headers in non-bearing walls.							
7	Ladders blocking at interior-wall-to-exterior wall intersections (i.e. Ladder T's at perpendicular wall intersection) and double rim joist in lieu of header (2X6 or deeper wall framing).							
8	Two stud corner framing or California Corners							
9	Engineered frame design							
	<b>General Materials Requirements:</b>							
1	Provide gutter downspout extensions or concrete splashguards and provide positive drainage away from the building or into storm sewer.							
2	Install metal drip edge at eaves and gable roof edges.							Review drawings, Visually inspect
3	(Optional Consideration) Provide minimum 12-inch roof overhangs based over at least 90 percent of exterior walls to protect the building envelope.							Review drawings Visually inspect
4	(Optional Consideration) Install a minimum of # 30 roofing felt on entire roof for moisture protection.							Review drawings Supporting documentation
5	(Optional Consideration) Use min class 4 roofing material.							Supporting documentations



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	<b>Termite Prevention:</b> Pre-treat the subgrade for subterranean termites with an EPA approved chemical insecticide prior to placement of the foundations and choose one (1) of the following termite prevention strategies							
1	Install a continuous, physical, non-chemical foundation termite barrier.							Review drawings, Supporting documentation Visually inspect during inspection
2	Use termite-resistant materials for structural components and exterior claddings of walls, floors, or exterior decks.							Review drawings, specifications Supporting documentation
3	Entire exposed slab must be at least 6-inches above the finished grade.							
<b>Innovative Options</b>								
<b>Innovative Options can be used in lieu of no more than one (1) of the program's optional requirements</b>								
1	Utilize a temporary "tree farm" by relocating trees and other vegetation during construction for re-planting at a later date.							
2	Provide common area recycling for tenants with "recycling only" containers							
3	Provide dedicated recycling areas in all units.							
4	Use Fly Ash or Slag Cement to reduce the amount of Portland cement on a project (can be used in stucco mix as well)							
5	Use Recycled materials including at least 50% recycled steel and OSB for exterior sheathing.							
6	Reduce the Heat Island Effect by using grey or white concrete or paving materials with a Solar Reflectance Index of 29 or greater for at least 50% of the site hardscape.							
7	Use water retention ponds for irrigation							
8	Use pervious concrete and permeable pavers to increase the infiltration of storm water.							
	End of Green Built Texas Path Checklist							

