

## APPENDIX B: BUILDING CODES BARRIERS MATRIX

### Type of Barrier

- Brick Wall (Hard) Barrier completely prevents a designer from meeting the LBC, unless the section is changed or modified.
- Hurdle (Soft) Barrier can be overcome if you jump high enough (added effort on the part of the design team). These are areas of the code to look at to see if code issue is of significant importance to warrant the extra effort.
- ~ Monetary (Financial) Barrier can be overcome if additional money is spent.
- ~ Site (Financial) Barrier can be overcome if additional land area is provided.
- ~ Constructability (Time) Barrier can be overcome if additional time is spent to appeal code or present alternate means.
- ~ Energy Efficiency (Time) Barrier can be overcome if additional time is spent to appeal code or present alternate means.

#	LBC Prereq. Affected	Type of Barrier	Code	Code Section	Description	Code Language	Project Concern	Code Issue
1	5 Materials Redlist / 6 Construction Carbon Footprint	Hurdle / Monetary	Building	509.5	Group R-2 Buildings of Type IIIA construction	The height limitation for buildings of Type IIIA construction in Group R-2 shall be increased to six stories and 75 feet where the first floor construction above the basement has a fire-resistance rating of not less than 3 hours and the floor area is subdivided by 2 hour fire resistance fire walls into areas not less than 3000 sf.	Code incentivizes steel buildings over wood due to fire resistance requirements. Wood is better choice for LBC projects based on regional availability, renewable resource, less embodied energy, and better U-value. For wood construction, this code requires the use of fire resistant plywood, some of which contains toxins on the materials redlist. Fire resistant plywood products that do not contain redlist materials are more costly.	Fire protection
2	5 Materials Redlist	Hurdle / Monetary	Building	704.11	Fire retardant wood	Walls that terminate at roofs of not less than 2-hour fire-resistant-rated construction or where the roof, including the deck and supporting construction, is constructed entirely of noncombustible materials.	Code requires the use of fire resistant plywood, some of which contains toxins on the materials redlist. Fire resistant plywood products that do not contain redlist materials are more costly.	Fire protection
3	4 Net zero Energy	Hurdle / Energy Efficiency	Building	1203.2	Attic Spaces - required insulation	Enclosed attics and enclosed rafter spaces formed where ceilings are applied directly to the underside of roof framing members shall have cross ventilation for each separate space by ventilating openings protected against the entrance of rain and snow. Blocking and bridging shall be arranged so as not to interfere with the movement of air. A minimum of 1 inch of airspace shall be provided between the insulation and the roof sheathing. The net free ventilating area shall not be less than 1/150 of the area of the space ventilated, with 50 percent of the required ventilating area provided by ventilators located in the upper portion of the space to be ventilated at least 3 feet above eave or cornice vents with the balance of the required ventilation provided by eave or cornice vents.	Vented roof in this climate not necessary. By requiring vent, cannot maximize insulation in rafter cavity making it more difficult to achieve net zero energy requirement. This is targeted to change in the 2009 Washington State Energy Code updates.	Prevent mold growth
4	4 Net zero Energy	Hurdle / Energy Efficiency	Building	1203.3.2	Under Floor Ventilation	The min. net area of ventilation opening shall not be less than 1 square foot for each 150 sf of crawl space areas.	Grey areas in code around best practice for energy efficiency and indoor air quality which is to mechanically condition crawl space and eliminate passive venting of cold outdoor air.	Prevent mold growth

## BUILDING CODES BARRIERS MATRIX (continued)

#	LBC Prereq. Affected	Type of Barrier	Code	Code Section	Description	Code Language	Project Concern	Code Issue
5	4 Net zero Energy	Hurdle / Energy Efficiency	Building	1205.2	Window area required for Natural Light	The minimum net glazed area shall not be less than 8 percent of the floor area of the room served.	Why mandate 8%? Some projects may be designed to use less while also ensuring adequate light and increasing energy efficiency.	Adequate Light-Addressed in commentary as a 10% floor area rule of thumb that was reduced
6	4 Net zero Energy	Hurdle/ Energy Efficiency	Building	1205.3	Artificial Light - average of 10 fc	Artificial light shall be provided that is adequate to provide an average illumination of 10 foot-candles over the area of the room at a height of 30 inches above the floor level.	Mandatory Fc requirement does not address needs of space. For instance, a bedroom might need less artificial lighting. Over-lighting spaces encourages higher energy use.	Adequate light
7	4 Net zero Energy	Hurdle/ Monetary	Building	1604.8.1	to use of Straw bale as a lateral element	Anchorage of the roof to walls and columns, and of walls and columns to foundations, shall be provided to resist the uplift and sliding forces that result from the application of the prescribed loads.	Straw bale is highly insulated, low-cost wall material. Structural strength of straw bale not known and testing is expensive.	Structural strength of straw bale
8	4 Net zero Energy	Hurdle/ Monetary	Building	Table 602	to use of Straw bale where fire rating is required	Table 602.provides fire rating requirements for exterior walls.	Straw bale is highly insulated, low-cost wall material. Not cost effective if additional fire protective material is required and testing is expensive.	Fire protection
9	5 Materials Red list / 8 Appropriate Materials Radius	Hurdle / Construct-ability	Building	2303.1	Preservative -treated Wood.	Lumber, timber, plywood, piles and poles supporting permanent structures required by Section 2304.11 to be preservative treated shall conform to the requirements of the applicable AWPA standard U1 and M4 for the species, product, preservative and end use. Preservatives shall be listed in Section 4 of the AWPA U1. Lumber and plywood used in wood foundations systems shall conform to Chapter 18.	Most wood preservatives approved by code are on the materials redlist. Natural species within the materials radius requirements would be a better option for LBC projects. Burden of proof is put on the design team to come up with a product that gets approved.	Prevent decay of wood structures and thus potential collapse of the building.
10	5 Materials Red list / 8 Appropriate Materials Radius	Hurdle / Construct-ability	Building	2303.4	Wood supported by Exterior Foundation	Wood framing members and furring strips attached directly to the interior of exterior masonry or concrete walls below grade shall be of approved naturally durable or preservative treated wood.	Most wood preservatives approved by code are on the materials redlist. Natural species within the materials radius requirements would be a better option for LBC projects. Burden of proof is put on the design team to come up with a product that gets approved.	Prevent decay of wood structures and thus potential collapse of the building.
11	5 Materials Red list / 8 Appropriate Materials Radius	Hurdle / Construct-ability	Building	2304.11	Wood used above ground, wood supported by exterior foundations, exterior walls below grade on inside of masonry, sleepers and sills, wood siding	Wood used above ground in the locations noted shall be naturally durable wood or preservative treated wood using water borne preservatives, in accordance with AWPA U1 for above ground use.	Most wood preservatives approved by code are on the materials redlist. Natural species within the materials radius requirements would be a better option for LBC projects. Burden of proof is put on the design team to come up with a product that gets approved.	Prevent decay of wood structures and thus potential collapse of the building.

**BUILDING CODES BARRIERS MATRIX (continued)**

#	LBC Prereq. Affected	Type of Barrier	Code	Code Section	Description	Code Language	Project Concern	Code Issue
12	4 Net zero Energy	Hurdle / Energy Efficiency	Energy	201	Definition: Design Heating and Cooling Conditions	The heating or cooling outdoor design temperatures shall be selected from 0.6% column for winter, and 0.5% column for summer from the Puget Sound Chapter of ASHRAE publication "Recommended Outdoor Design Temperatures, Washington State, ASHRAE."	Is this the right temperature reference to use for Vancouver and Clark County? Allowing wider design temperatures may result in higher efficiency. Larger projects can demonstrate this through energy modeling, smaller projects and affordable housing would benefit from prescriptive approach. ASHRAE 55-2004 provides expanded comfort criteria for naturally ventilated spaces.	Thermal comfort
13	4 Net zero Energy	Hurdle / Energy Efficiency	Energy	201	Definitions: Advanced Framing	Advanced Framed Walls: Studs framed on 24 inch centers with double top plate and single bottom plate. Corners use two studs or other means of fully insulating corners, and one stud is used to support each header. Headers consist of double 2x material with R-10 insulation between the header and exterior sheathing. Interior partition wall/exterior wall intersections are fully insulated in the exterior wall. [See Standard Framing and Section 1005.2 of this Code.] Advanced Framed Ceilings: Advanced framing assumes full and even depth of insulation extending to the outside edge of exterior walls. [See Standard Framing and Section 1007.2 of this Code.]	Other definitions of advanced framing include single top plate allowing decreased use of materials and increased energy efficiency.	Structural integrity?
14	4 Net zero Energy	Hurdle/ Energy Efficiency	Energy	301.2	Heating & Cooling - more stringent envelope reqs	A building that is designed to be both heated and cooled shall meet the more stringent of the heating or cooling requirements as required in this code when requirements of the exterior envelope differ.	This code option doesn't allow for energy programming, or maximizing efficiencies between areas of the building which might provide waste heat. Reduced opportunities for design team to design most appropriate envelope to meet net zero energy goals.	Precedent for more stringent requirements
15	4 Net zero Energy	Hurdle/ Energy Efficiency	Energy	302.2.1	Indoor Design Temperature - 70 F Heating 78 F Cooling	Indoor design temperature shall be 70° F for heating and 78 degrees F for cooling. Exception: Other design temperatures may be used for equipment selection if it results in a lower energy usage.	Exception doesn't address how to prove lower energy usage. Possible financial burden for smaller projects and affordable housing projects. ASHRAE 55-2004 provides expanded comfort criteria for naturally ventilated spaces.	Thermal comfort
16	4 Net zero Energy	Hurdle	Energy	302.1	Exterior Design Conditions	The heating or cooling outdoor design temperatures shall be selected from 0.6% column for winter, and 0.5% column for summer from the Puget Sound Chapter of ASHRAE publication "Recommended Outdoor Design Temperatures, Washington State, ASHRAE." [See also Washington State Energy Code Manual.]	May be too stringent; consider 1, 2, or 4% data with expanded interior design conditions	why these?
17	4 Net zero Energy	Hurdle/ Energy Efficiency	Energy	502.1.4.3	Insulation Clearances	Where required, insulation shall be installed with clearances according to manufacturer's specifications. Insulation shall be installed so that required clearances shall be maintained through installed of a permanent retainer.	Similar to IRC issue. In this climate, can't maximize insulation so more difficult to achieve net zero energy.	Mold growth

## BUILDING CODES BARRIERS MATRIX (continued)

#	LBC Prereq. Affected	Type of Barrier	Code	Code Section	Description	Code Language	Project Concern	Code Issue
18	5 Materials Red List	Hurdle / Construct-ability	Energy	502.1.6.2	Floors: Vapor retarders	Floors separating conditioning space from unconditioned space shall have a vapor retarder installed. The vapor retarder shall have a one perm dry cup rating or less (i.e. four mil [0.004 inch thick] polyethylene or Kraft faced material).	Conventional materials contain toxins on the materials redlist. Alternative products carry a cost premium.	Moisture protection
19	5 Materials Red List	Hurdle / Construct-ability	Energy	502.1.6.6	Walls: Vapor retarders	Walls separating conditioned space from unconditioned space shall have a vapor retarder installed. Faced batt insulation shall be face stapled. Exception: For Climate Zone 1, wood framed walls with a minimum of nominal R-5 continuous insulated sheathing installed outside of the framing and structural sheathing. For Climate Zone 2, wood framed walls with a minimum of nominal R-7.5 continuous insulated sheathing interior cavity insulation for this exception shall be a maximum of nominal R-21.	Conventional materials contain toxins on the materials redlist. Alternative products carry a cost premium.	Moisture protection
20	4 Net zero Energy	Hurdle / Construct-ability	Energy	502.1.4.8	Slab on Grade insulation	Slab-on-grade insulation, installed inside the foundation wall, shall extend downward from the top of the slab for a minimum distance of 24 inches or downward and then horizontally beneath the slab for a minimum of 24 inches. Insulation installed outside the foundation shall extend downward to a minimum of 24 inches or to the frost line. Above grade insulation shall be protected. Exception: For monolithic slabs, the insulation shall extend downward from the top of the slab to the bottom of the footing.	Where insulation is located inside the foundation wall, connection between foundation and slab not addressed.	Thermal break
21	5 Materials Red List	Hurdle / Monetary	Energy	502.1.6.7 1313.5	Ground cover of black polyethylene	A ground cover of 0.006 inch thick black polyethylene or approved equal shall be laid over the ground within crawl spaces. The ground cover shall be overlapped 12 inches minimum at the joints and shall extend to the foundation wall. Exception: The ground cover may be omitted in crawl spaces if the crawl space has a concrete slab floor with a minimum thickness of 3 1/2 inches.	Conventional ground cover materials contain toxins on the materials redlist. Alternative products carry a cost premium.	Moisture protection
22	4 Net zero Energy	Hurdle / Energy Efficiency	Indoor Air Quality	502.1.2	Ventilation	All crawl spaces shall be ventilated as specified in 1203.3 of the International Building Code.	This requirement in the IBC adds extra outside air and potential energy loss, doesn't account for heated crawl spaces.	Mold growth
23	4 Net zero Energy	Hurdle / Energy Efficiency	Energy	505.3	Outdoor Lighting	Luminaires providing outdoor lighting and permanently mounted to a residential building or to other buildings on the same lot shall be high efficacy luminaires.	Definition does allow for new technology like LEDs unless it is put on a motion sensor- LEDs not currently conducive to a motion sensor. Code could identify maximum wattage as opposed to fixture type.	
24	11 Water Discharge	Brick Wall	Plumbing	305.1	Sewers Required - every bldg. must have a connection to a public sewer	Every building in which plumbing fixtures are installed shall have a connection to a public or private sewer except as provided in Section 305.2.	Only exception is for projects without sewer available for use	Public Health

**BUILDING CODES BARRIERS MATRIX (continued)**

#	LBC Prereq. Affected	Type of Barrier	Code	Code Section	Description	Code Language	Project Concern	Code Issue
25	5 Materials Red List	Hurdle / Construct-ability	Plumbing	311.8	Screwed fittings options do not include green materials	Screwed fittings shall be ABS, cast iron, copper alloy, malleable iron, PVC, steel, or other approved materials. Threads shall be tapped out of solid metal or molded in solid ABS or PVC.	Some newer materials are more environmentally sensitive choices (PEX). What level of proof and approval required for materials not list in code language?	
26	10 Net zero Water	Hurdle / Construct-ability	Plumbing	405.3	Urinals that don't have a wash at each discharge are prohibited	Fixed wooden or tile wash trays or sinks for domestic use shall not be installed in any building designed or used for human habitation. No sheet metal-lined wooden bathtub shall be installed or reconnected. No dry or chemical closet (toilet) shall be installed in any building used for human habitation, unless first approved by the Health Officer.	Conflicts with UPC section 601 exemption for waterless fixtures.	Cleaning
27	10 Net zero Water	Hurdle / Monetary	Plumbing	409	Water supply to Urinal	Every water supply to a urinal shall be protected by an approved-type vacuum breaker or other approved backflow prevention device as described in Section 603.3.	For waterless urinals, extra cost for redundant system.	
28	10 Net zero Water	Hurdle / Monetary	Plumbing	601	Running Water Required	Except where not deemed necessary for safety or sanitation by the Authority Having Jurisdiction, each plumbing fixture shall be provided with an adequate supply of potable running water piped thereto in an approved manner, so arranged as to flush and keep it in clean and sanitary condition without danger of backflow or cross-connection. Water closets and urinals shall be flushed by means of an approved flush tank or flushometer valve. In jurisdictions that adopt Chapter 16, water closets, urinals, and trap primers in designated non-residential buildings may be provided with reclaimed water as defined and regulated by Chapter 16 of this code. Exception: Listed fixtures that do not require water for their operation and are not connected to the water supply.	Requiring potable water supply to all fixtures undermines ability of a LBC project to use harvested rainwater or reclaimed greywater for toilet flushing to meet zero water goals. Dual piping may be necessary which provides a financial barrier for affordable housing projects.	Public health
29	10 Net zero Water	Hurdle	Plumbing	610.1	Size of Potable Water Piping	The size of each water meter and each potable water supply pipe from the meter or other source of supply to the fixture supply branches, risers, fixtures, connections, outlets, or other uses shall be based on the total demand and shall be determined according to the methods and procedures outlined in this section. Water piping systems shall be designed to ensure that the maximum velocities allowed by the code and the applicable standard are not exceeded.	Water sizing regulations based on older fixtures - resulting in water losses.	

## BUILDING CODES BARRIERS MATRIX (continued)

#	LBC Prereq. Affected	Type of Barrier	Code	Code Section	Description	Code Language	Project Concern	Code Issue
30	11 Water Discharge	Hurdle/ Site	Plumbing	1101.1	Storm Drainage - code requires storm drainage system	All roofs, paved areas, yards, courts, and courtyards shall be drained into a separate storm sewer system, or into a combined sewer system where a separate storm system is not available, or to some other place of disposal satisfactory to the Authority Having Jurisdiction. In case of one- and two-family dwellings, storm water may be discharged on flat areas such as streets or lawns so long as the storm water shall flow away from the building and away from adjoining property, and shall not create a nuisance.	Standard requires AHJ to independent evaluate - rather than providing standards. LBC projects manage stormwater onsite where feasible so connection to storm sewer would require an appeal.	Standing water
31	10 Net zero Water/ 11 Water Discharge	Hurdle	Plumbing	1602	Gray Water definition	Gray water is untreated household wastewater that has not come into contact with toilet waste. Gray water includes used water from bathtubs, showers, and bathroom wash basins, and water from clothes washers and laundry tubs. It shall not include wastewater from kitchen sinks or dishwashers.	Definition doesn't include wastewater from mechanical systems or other commercial uses.	
32	10 Net zero Water/ 11 Water Discharge	Hurdle/ Site	Plumbing	1606	Procedure for Estimating Gray Water Discharge	(A) The number of occupants of each dwelling unit shall be calculated as follows: First bedroom = 2; Each additional bedroom = 1. (B) The estimated gray water flows for each occupant shall be calculated as follows: Showers, bathtubs and washbasins = 25 GPD (95LPD); Laundry = 15 GPD (57 LPD). (C) The total number of occupants shall be multiplied by the applicable estimated gray water discharge as provided above, and the type of fixtures connected to the gray water system. Example 1: Single-family dwelling; three bedrooms with showers, bathtubs, washbasins, and laundry facilities all connected to the gray water system: Total number of occupants = 2 + 1 + 1 = 4; Estimated gray water flow = 4 x (25 + 15) = 160 GPD, metric = 4 x (95 + 57) = 608 LPD. Example 2: Single-family dwelling; four bedrooms with only the clothes washer connected to the gray water system: Total number of occupants = 2 + 1 + 1 = 5; Estimated gray water flow = 5 x 15 = 75 GPD, metric = 5 x 57 = 285 LPD.	Overestimates gray water by a factor of 4, requiring more area required for subsurface drip irrigation systems. Calculations should use more efficient fixture performance.	

**BUILDING CODES BARRIERS MATRIX (continued)**

#	LBC Prereq. Affected	Type of Barrier	Code	Code Section	Description	Code Language	Project Concern	Code Issue
33	10 Net zero Water	Brick wall	Plumbing	1614	Definitions	Reclaimed water is water that, as a result of tertiary treatment of domestic wastewater by a public agency, is suitable for a direct beneficial use or a controlled use that would not otherwise occur. The level of treatment and quality of the reclaimed water shall be approved by the public health Authority Having Jurisdiction. For the purpose of this chapter, tertiary treatment shall result in water that is adequately oxidized, clarified, coagulated, filtered, and disinfected so that at some location in the treatment process, the seven (7) day median number of total coliform bacteria in daily samples does not exceed two and two-tenths (2.2) per one hundred (100) milliliters, and the number of total coliform bacteria does not exceed twenty-three (23) per one hundred (100) milliliters in any sample. The water shall be filtered so that the daily average turbidity does not exceed two (2) turbidity units upstream from the disinfection process. Specifically excluded from this definition is gray water, which is defined in Part 1 of this chapter.	Exception does not allow gray water, which may be necessary to achieve net zero water.	Gray water excluded from reclaimed water definition
34	5 Materials Redlist	Hurdle / Construct-ability	Plumbing	1617	Pipe Material - Reclaimed water pipe marked by tape fabricated by poly vinyl chloride	Reclaimed water piping and fittings shall be as required in this code for potable water piping and fittings. All reclaimed water pipe and fittings shall be continuously wrapped with purple-colored Mylar. The wrapping tape shall have a minimum nominal thickness of five ten-thousandths (0.0005) inch and a minimum width of 2 inches. Tape shall be fabricated of poly(vinyl chloride) with a synthetic rubber adhesive and a clear polypropylene protective coating or approved equal. The tape shall be purple (Pantone color #512) and shall be imprinted in nominal 1/2 inch high, black uppercase letters, with the words, "CAUTION: RECLAIMED WATER, DO NOT DRINK." The lettering shall be imprinted in two parallel lines, such that after wrapping the pipe with a 1/2 width overlap, one full line of text shall be visible. Wrapping tape is not required for buried PVC pipe manufactured with purple color integral to the plastic and marked on opposite sides to read, "CAUTION: RECLAIMED WATER, DO NOT DRINK" in intervals not to exceed three feet. All valves, except fixture supply control valves shall be equipped with a locking feature. All mechanical equipment that is appurtenant to the reclaimed water system shall be painted to match the Mylar wrapping tape.	Code definition of marking tape violates materials redlist prerequisite. Expand definition of what types of materials can be used for marking.	Need to identify pipe

## BUILDING CODES BARRIERS MATRIX (continued)

#	LBC Prereq. Affected	Type of Barrier	Code	Code Section	Description	Code Language	Project Concern	Code Issue
35	11 Water Discharge	Hurdle/ Site	Plumbing	1101.5.6	Subsoil drains - must be 10' from property line	Nothing in Section 1101.5 shall prevent drains that serve either subsoil drains or areaways of a detached building from discharging to a properly graded open area, provided that: 1. They do not serve continuously flowing springs or groundwater; 2. The point of discharge is at least 10 feet from any property line; and 3. It is impracticable to discharge such drains to a storm drain, to an approved water course, to the front street curb or gutter, or to an alley.	LBC projects attempt to manage all water on site. Adequate site area required to manage all storm drainage.	
36	11 Water Discharge	Brick Wall	Plumbing	1601.A	Gray Water allowed for single family only for underground landscape irrigation	The provisions of this chapter shall apply to the construction, alteration, and repair of gray water systems for underground landscape irrigation. Installations shall be allowed only in single-family dwellings. The system shall have no connection to any potable water system and not result in any surfacing of the gray water. Except otherwise provided for in this chapter, the provisions of this code shall be applicable to gray water installation.	Code does not allow greywater subsurface drip irrigation systems for multifamily buildings.	Contamination
37	10 Net zero Water	Brick Wall	Plumbing	1618.0(A)	Hose Bib installation	Hose bibs shall not be allowed on reclaimed water piping systems.	Hose bibs should be allowed on the reclaimed water system to meet zero water goals.	Contamination
38	10 Net zero Water	Hurdle/ Monetary	Plumbing	1618.0(B)	Installation - requires devices to allow for deactivation	The reclaimed water system and the potable water system within the building shall be provided with the required appurtenances (valves, air/vacuum relief valves, etc.) to allow for deactivation or drainage as may be required by this chapter.	Cost issues for deactivation drainage.	Contamination
39	10 Net zero Water	Hurdle/ Site	Plumbing	1618.0(C)	Trenching - reclaimed can't be in same trench - must be 10' away	Reclaimed water pipes shall not be run or laid in the same trench as potable water pipes. A ten foot horizontal separation shall be maintained between pressurized, buried reclaimed and potable water piping. Buried potable water pipes crossing pressurized reclaimed water pipes shall be laid a minimum of 12 inches above the reclaimed water pipes. Reclaimed water pipes laid in the same trench or crossing building sewer or drainage piping shall be installed in compliance with Sections 609.0 and 720.0 of this code. Reclaimed water pipes shall be protected similar to potable water pipes.	Requires very large lot to make reclaimed water supply systems feasible.	Contamination
40	5 Materials Red list	Hurdle / Construct-ability	Plumbing	Appendix	Pipe Standards	UPC provides standards for PVC and CPVC only.	No standards for alternative plumbing materials not listed on materials redlist (i.e. PEX).	
41	10 Net zero Water	Hurdle/ Site	Plumbing	Table 16-1	Location of Gray Water System	Table 16-1 provides setback requirements for greywater holding tanks and disposal fields.	Requires very large lot to handle greywater. Allowing greywater for reuse can help LBC projects meet LBC goals for net zero water.	Contamination

**BUILDING CODES BARRIERS MATRIX (continued)**

#	LBC Prereq. Affected	Type of Barrier	Code	Code Section	Description	Code Language	Project Concern	Code Issue
42	11 Water Discharge	Hurdle / Construct-ability	Mechanical	307.2.1	condensate disposal	Condensate from all cooling coils and evaporators shall be conveyed from the drain pan outlet to an approved place of disposal. Condensate shall not discharge into a street, alley or other areas so as to cause a nuisance.	Water source to drainage system - needs to be dealt with on site for LBC projects. Consider allowing reuse of condensate.	
43	4 Net zero Energy	Hurdle/ Energy Efficiency	Mechanical	403.2	Outdoor Air Required	The minimum ventilation rate of required outdoor air shall be determined in accordance with Section 403.3.	Ventilation rates based solely on occupancy tend to supply more outside air than necessary by other methods. Allowing air quality sensors for measuring minimum ventilation can help save energy.	Indoor Air Quality
44	4 Net zero Energy	Hurdle/ Energy Efficiency	Mechanical	403.3	Ventilation Rate	Ventilation systems shall be designed to have the capacity to supply the minimum outdoor airflow rate determined in accordance with table 403.3 based on the occupancy of the space and the occupant load or other parameter as stated therein. The occupant load utilized for design of the ventilation system shall not be less than the number determined from the estimated maximum occupant load rate indicated in Table 403.3. Ventilation rates for occupancies not represented in Table 403.3 shall be determined by an approved engineering analysis. The ventilation system shall be designed to supply the required rate of ventilation air continuously during the period the building is occupied, except as otherwise stated in other provisions of the code. Exception: The occupant load is not required to be determined, based on the estimated maximum occupant load rate indicated in Table 403.3 where approved statistical data document the accuracy of an alternate occupant density.	Table over predicts occupancy by basing maximum on egress levels rather than design occupancy.	Indoor Air Quality
45	4 Net zero Energy	Hurdle/ Energy Efficiency	Mechanical	514.2	Energy Recovery Ventilation Systems - prohibited applications	Energy recovery ventilation systems shall not be used in the following systems: 1. Hazardous exhaust systems covered in Section 510. 2. Dust, stock, and refuse systems that convey explosive or flammable vapors, fumes or dust. 3. Smoke control systems covered in Section 513. 4. Commercial kitchen exhaust systems serving Type I and Type II hoods. 5. Clothes dryer exhaust systems covered in Section 504.	Losing opportunities for heat reclaim.	Contamination
46	10 Net zero Water	Hurdle	Mechanical	1005.2	Potable Water Supply (Boilers)	The water supply to all boilers shall be connected in accordance with the International Plumbing Code.	Nonpotable water supply such as reclaimed water can assist with meeting net zero water goals.	Legionnaires disease
47	11 Water Discharge	Hurdle/ Site	Mechanical	1009.3	Open-type expansion tank (drainage)	Open-type expansion tanks shall be located a minimum of 4 feet above the highest heating element. The tank shall be adequately sized for the hot water system. An overflow with a minimum diameter of 1 inch shall be installed at the top of the tank. The overflow shall discharge the drainage system in accordance with the International Plumbing Code.	Water source to drainage system - needs to be dealt with on site, consider defining overflow as greywater allowed for toilet flushing.	Contamination

**BUILDING CODES BARRIERS MATRIX (continued)**

#	LBC Prereq. Affected	Type of Barrier	Code	Code Section	Description	Code Language	Project Concern	Code Issue
48	11 Water Discharge	Hurdle/ Site	Mechanical	1206.2	System Drain Down	Hydronic piping systems shall be designed and installed to permit the system to be drained. Where the system drains to the plumbing drainage system, the installation shall conform to the requirements of the International Plumbing Code.	Water source to drainage system - needs to be dealt with on site, consider allowing for drainage to a greywater reuse system.	
49	3 Habitat Exchange 11 Water Discharge	Hurdle/ Site	Fire	503.1.1	Fire Apparatus Access Roads	Approved fire apparatus access roads shall be provided for every facility, building, or portion of a building and shall extend to within 150' of all portions of the facility.	More land required to achieve fire access for residential development.	To allow fire trucks to easily enter and exit the site to assist in fire fighting
50	3 Habitat Exchange 11 Water Discharge	Hurdle/ Site	Fire	D106.1	Fire Apparatus Access Roads	Multi-Family residential projects having more than 100 dwellings units shall be equipped throughout with two separate and approved fire apparatus access roads.	More land required to achieve fire access for residential development.	To allow fire trucks to easily enter and exit the site to assist in fire fighting