

Minority Report: Interior Lighting Power Allowances

Duane Jonlin, Energy Code TAG Chair

During its deliberations, members of the Energy Code TAG developed several alternative lighting power allowance (LPA) tables. The TAG ultimately voted for a table which provides only modest energy savings, leaving substantial potential savings on the table. As it does not appear that we will meet our mandated energy reduction target this code cycle, the lighting table could provide one of our only opportunities to increase savings.

An alternate table (not approved by the TAG) was created by *increasing* the allowances for 21 (mostly small) space types for which the 2015 WA values appeared to be too low, based on values in ASHRAE 90.1 Addendum bb and the 2019 California Title 24. Using this revised WA table as a baseline, LPAs were then reduced wherever the new ASHRAE 90.1 table showed a lower value. (Note that the revised ASHRAE and California LPA tables are based on extensive research based on LED technology, and the two projects reached similar conclusions.)

Based on an analysis by Mike Kennedy, this approach would reduce allowable lighting energy use by 9%, whereas the approved table would save only 4.5%. (A third proposal considered by the TAG, using a combination of 2015 Seattle values and the new ASHRAE values, would have saved 15%.)

A few important points to consider in this decision:

- LED lighting with this efficacy is already standard practice. Seattle's current code includes an across-the-board 10% reduction in lighting power, and every project submitted beats this target. Therefore, this proposal involves little or no additional construction cost.
- The *efficacy* of LED lighting has been steadily improving by several percentage points each year, and the *cost* of LED lighting has been decreasing at a similar rate. Since these proposed code values will start impacting projects two years from now, four years after the last WA code went into effect, lighting will require even less energy. And projects will continue to be constructed under the 2018 code well into 2025. This code should be forward-looking, not backward-looking.
- As well as encouraging the implementation of high-efficiency lighting, this tighter lighting power requirement will help to maintain the integrity of the energy modeling process, in that unrealistically high baseline values for lighting can't be "traded" for a devalued building envelope.

Building Area Values

| | | | | | | |
|---------------------------------------|------|------|------|------|------|------|
| Simple Average LPD | 0.69 | 0.64 | 0.63 | 0.65 | 0.63 | |
| Important Category Average LPD | 0.62 | 0.56 | 0.56 | 0.58 | 0.58 | 0.58 |

| | Integrated Draft WSEC 2015 + | Seattle 2018 | Seattle 2018 + IECC 2018 | 189.1 | 189.1 + Integrated Draft | Title 24 proposal 2019 |
|-----------------------------|------------------------------|--------------|--------------------------|-------|--------------------------|------------------------|
| | LPD | LPD | LPD | LPD | LPD | LPD |
| Automotive facility | 0.64 | 0.58 | 0.58 | 0.64 | 0.64 | 0.6 |
| Convention center | 0.76 | 0.73 | 0.73 | 0.51 | 0.51 | 0.65 |
| Court house | 0.81 | 0.73 | 0.73 | 0.74 | 0.74 | 0.7 |
| Dining: Bar lounge/leisure | 0.79 | 0.71 | 0.71 | 0.69 | 0.69 | 0.7 |
| Dining: Cafeteria/fast food | 0.72 | 0.65 | 0.65 | 0.66 | 0.66 | 0.7 |
| Dining: Family | 0.71 | 0.64 | 0.64 | 0.61 | 0.61 | 0.7 |
| Dormitory | 0.46 | 0.41 | 0.41 | 0.52 | 0.46 | |
| Exercise center | 0.65 | 0.6 | 0.6 | 0.61 | 0.61 | 0.65 |
| Fire station | 0.53 | 0.49 | 0.49 | 0.50 | 0.50 | |
| Gymnasium | 0.68 | 0.68 | 0.68 | 0.67 | 0.67 | 0.65 |
| Health care clinic | 0.70 | 0.7 | 0.7 | 0.68 | 0.68 | 0.7 |
| Hospital | 0.84 | 0.84 | 0.84 | 0.86 | 0.84 | 0.9 |
| Hotel | 0.70 | 0.63 | 0.63 | 0.70 | 0.70 | |
| Library | 0.78 | 0.85 | 0.78 | 0.72 | 0.72 | 0.7 |
| Manufacturing facility | 0.89 | 0.8 | 0.8 | 0.60 | 0.60 | 0.6 |
| Motel | 0.70 | 0.63 | 0.63 | 0.70 | 0.70 | |
| Motion picture theater | 0.61 | 0.55 | 0.55 | 0.62 | 0.61 | 0.6 |
| Multifamily | 0.41 | 0.37 | 0.37 | 0.49 | 0.41 | |
| Museum | 0.80 | 0.72 | 0.72 | 0.68 | 0.68 | |
| Office | 0.66 | 0.59 | 0.59 | 0.69 | 0.66 | 0.65 |
| Parking garage | 0.15 | 0.14 | 0.14 | 0.12 | 0.12 | 0.13 |
| Penitentiary | 0.65 | 0.59 | 0.59 | 0.67 | 0.65 | |
| Performing arts theater | 1.00 | 0.9 | 0.9 | 0.85 | 0.85 | 0.8 |
| Police station | 0.70 | 0.63 | 0.63 | 0.68 | 0.68 | |
| Post office | 0.67 | 0.63 | 0.63 | 0.62 | 0.62 | |
| Religious building | 0.80 | 0.72 | 0.72 | 0.70 | 0.70 | 0.7 |
| Retail | 1.01 | 0.91 | 0.91 | 0.91 | 0.91 | 0.9 |
| School/university | 0.70 | 0.63 | 0.63 | 0.67 | 0.67 | 0.65 |
| Sports arena | 0.624 | 0.56 | 0.56 | 0.76 | 0.62 | 0.75 |
| Town hall | 0.71 | 0.64 | 0.64 | 0.72 | 0.71 | 0.7 |
| Transportation | 0.56 | 0.5 | 0.5 | 0.51 | 0.51 | |
| Warehouse | 0.40 | 0.36 | 0.36 | 0.41 | 0.40 | 0.45 |
| Workshop | 0.90 | 0.9 | 0.9 | 0.83 | 0.83 | |

| DB proposal | LPD | Reason | Important Category |
|-------------|------|--------|--|
| | 0.58 | 0.64 | |
| | 0.51 | 0.76 | IECC Value is reasonable target |
| | 0.73 | 0.81 | |
| | 0.69 | 0.79 | Encourage good dining experience lighting. This is not a high target energy consumption area. |
| | 0.65 | 0.66 | |
| | 0.61 | 0.71 | Why penalize dining areas in communal locations? |
| | 0.41 | 0.52 | |
| | 0.60 | 0.65 | Give the exercise places a slight uptick to allow for more hospitality treatments. Exercise is good. |
| | 0.49 | 0.50 | |
| | 0.67 | 0.67 | |
| | 0.68 | 0.68 | |
| | 0.84 | 0.86 | |
| | 0.63 | 0.70 | |
| | 0.72 | 0.78 | Was .94, going to .72 is a big jump, libraries should be destinations |
| | 0.60 | 0.89 | This is too big of a change. The impact on manufacturing could be harmful. |
| | 0.63 | 0.70 | |
| | 0.55 | 0.61 | WSEC lower |
| | 0.37 | 0.41 | WSEC lower |
| | 0.68 | 0.80 | Analyze before dropping to much lower value - not many projects |
| | 0.59 | 0.66 | WSEC lower |
| | 0.12 | 0.14 | Big jump. Controls are having an impact already |
| | 0.59 | 0.65 | WSEC lower |
| | 0.85 | 1.00 | Analyze before dropping to much lower value - not many projects |
| | 0.63 | 0.68 | |
| | 0.62 | 0.67 | Fine print tasks |
| | 0.70 | 0.80 | |
| | 0.91 | 0.91 | |
| | 0.63 | 0.67 | Can we do this? |
| | 0.56 | 0.75 | WSEC lower |
| | 0.64 | 0.71 | |
| | 0.50 | 0.51 | |
| | 0.36 | 0.40 | WSEC lower |
| | 0.83 | 0.90 | Studios with fine print needs? |

GENERAL INDUSTRY COMMENTS:

1
1
1
1
1

Building Area Values

| | | | | | | |
|-------------------------------------|------|------|------|------|------|------|
| Simple Average LPD | 0.69 | 0.64 | 0.63 | 0.65 | 0.63 | |
| Important Category Average I | 0.62 | 0.56 | 0.56 | 0.58 | 0.58 | 0.58 |

| | | | | | | |
|--|------------------------------|--------------|--------------------------|-------|--------------------------|------------------------|
| | Integrated Draft WSEC 2015 + | Seattle 2018 | Seattle 2018 + IECC 2018 | 189.1 | 189.1 + Integrated Draft | Title 24 proposal 2019 |
|--|------------------------------|--------------|--------------------------|-------|--------------------------|------------------------|

| | | |
|-------------|-------------|------|
| | 0.61 | 0.68 |
| | 0.55 | 0.60 |
| DB proposal | CJ Proposal | |

1. The wattages for food prep areas need to stay higher. IESNA recommends 50 fc for kitchens, and it's hard to achieve when you're dealing with a food court tenant with very little square footage to get the baseline wattage. Some kitchen spaces also have relatively high (10') ceilings and movable wire racks, so there's no place to mount undercabinet fixtures.

2. By limiting the classroom wattage, it will limit the classroom lighting design. I'm working on a college classroom (about 28 seats) that needs to be flexible for the different professors that use the same space. The client wants marker boards wallwashed on 3 of 4 walls, plus the ambient lighting. I'm barely meeting the code now using all LED.

3. I understand the LPD must be reduced, however, anything more than a 20% drop from the current 2012 WSEC LPD's (not the ingrated draft LPD's) is too drastic of a cut with the current and projected technology.

4. From my point of view, the proposed numbers are quite low. Even when going with all LED product for offices, we are typically around 0.7w/sqft. That number may be higher in a small space. I can't say that I have a large batch of case studies to prove my point, but 33% reduction is steep any way you slice it. If we need to get to this range of LPD, we should be considering operating LPD and not connected load. With our daylight control requirements, we are typically using much less energy than the LPD would have folks believe.

Space-by-space

| Categories | Integrated Draft (Best of WSEC 2015 & IECC 2018) | California Title 24 2019 proposal | 9% savings | | | 15% savings | 4.5% savings |
|--|--|-----------------------------------|--|-------------------------|-------------------------------------|-----------------|-----------------------------------|
| | | | Jonlin Proposal (red font indicates value adjusted higher) | ASHRAE 90.1 Addendum bb | 90.1 Addendum bb + Integrated Draft | Baylon Proposal | Brockway Proposal (TAG selection) |
| COMMON SPACE-BY-SPACE TYPES ^a | LPD | LPD | LPD | LPD | LPD | LPD | LPD |
| Atrium - First 40 feet in height (per foot) | 0.02 | | 0.02 | 0.48 | 0.02 | 0.02 | 0.02 |
| Atrium - Above 40 feet in height (per foot) | 0.02 | | 0.02 | 0.70 | 0.02 | 0.02 | 0.15 |
| Audience Seating Area | | | | | | | |
| In an auditorium | 0.50 | 0.70 | 0.61 | 0.61 | 0.50 | 0.45 | 0.67 |
| In a convention center | 0.66 | 0.48 | 0.25 | 0.25 | 0.25 | 0.59 | 0.65 |
| In a gymnasium | 0.34 | 0.48 | 0.23 | 0.23 | 0.23 | 0.31 | 0.43 |
| In a motion picture theater | 0.91 | 0.60 | 0.27 | 0.27 | 0.27 | 0.64 | 0.82 |
| In a penitentiary | 0.22 | | 0.44 | 0.67 | 0.22 | 0.22 | 0.44 |
| In a performing arts theater | 1.94 | 1.00 | 1.06 | 1.06 | 1.06 | 1.34 | 1.75 |
| In a religious building | 1.22 | 0.96 | 0.72 | 0.72 | 0.72 | 0.98 | 1.10 |
| In a sports arena | 0.34 | | 0.33 | 0.33 | 0.33 | 0.31 | 0.34 |
| Otherwise | 0.34 | 0.6+ | 0.23 | 0.23 | 0.23 | 0.31 | 0.40 |
| Banking activity area | 0.81 | 0.80 | 0.61 | 0.61 | 0.61 | 0.73 | 0.79 |
| Breakroom (see Lounge/breakroom) | | | | | | | |
| Beauty salon, barber area | | .8++ | | | 0.00 | 1.00 | 1.00 |
| Classroom/lecture hall/training room | | | | | | | |
| In a penitentiary | 1.07 | 1.38 | 1.07 | 1.38 | 1.07 | 0.96 | 1.06 |
| Otherwise | 0.96 | .7+m | 0.84 | 0.84 | 0.84 | 0.74 | 0.96 |
| Computer room | 1.33 | | 1.33 | | 1.33 | 1.16 | 1.16 |
| Conference/meeting/multipurpose | 0.98 | 0.85 | 0.97 | 0.97 | 0.97 | 0.88 | 0.93 |
| Confinement Cell | 0.81 | 0.70 | 0.70 | 0.70 | 0.70 | 0.52 | 0.81 |
| Copy/print room | 0.56 | 0.50 | 0.50 | 0.31 | 0.31 | 0.50 | 0.56 |
| Corridor | | | | | | | |
| In a facility for the visually impaired (and not used primarily by the staff) ^b | 0.74 | 0.71 | 0.71 | 0.71 | 0.71 | 0.74 | 0.74 |
| In a hospital | 0.63 | 0.71 | 0.63 | 0.71 | 0.63 | 0.63 | 0.63 |
| In a manufacturing facility | 0.29 | | 0.29 | 0.41 | 0.29 | 0.28 | 0.28 |
| Otherwise | 0.53 | 0.60 | 0.41 | 0.41 | 0.41 | 0.48 | 0.53 |
| Courtroom | 1.38 | 0.72 | 1.25 | 1.25 | 1.25 | 0.98 | 1.38 |
| Computer room | 1.33 | | 1.00 | 1.00 | 1.00 | 1.16 | 1.16 |
| Dining area | | | | | | | |
| In a penitentiary | 0.77 | | 0.42 | 0.42 | 0.42 | 0.69 | 0.72 |
| In a facility for the visually impaired (and not used primarily by the staff) ^b | 1.52 | | 1.38 | 1.38 | 1.38 | 1.48 | 1.48 |
| In bar/lounge or leisure dining | 0.86 | 0.55 | 0.86 | 0.86 | 0.86 | 0.62 | 0.86 |
| Cafeteria or fast food | 0.63 | 0.40 | 0.40 | 0.40 | 0.40 | 0.53 | 0.63 |
| In family dining area | 0.71 | 0.5 + n | 0.60 | 0.60 | 0.60 | 0.54 | 0.71 |
| Otherwise | 0.52 | 0.4 + n | 0.43 | 0.43 | 0.43 | 0.47 | 0.52 |
| Electrical/mechanical | 0.43 | 0.40 | 0.42 | 0.42 | 0.42 | 0.39 | 0.76 |
| Emergency vehicle garage | 0.41 | | 0.41 | 0.52 | 0.41 | 0.41 | 0.41 |
| Food preparation | 0.79 | 0.95 | 0.92 | 1.29 | 0.79 | 0.71 | 0.92 |
| Guest room | 0.38 | ??? | 0.41 | 0.41 | 0.38 | 0.38 | 0.75 |
| Laboratory | | | | | | | |
| In or as a classroom | 1.02 | 1 + o | 1.02 | 1.17 | 1.02 | 0.92 | 1.04 |
| Otherwise | 1.45 | 1 + o | 1.45 | 1.70 | 1.45 | 1.24 | 1.24 |
| Laundry/washing area | 0.43 | 0.43 | 0.43 | 0.59 | 0.43 | 0.43 | 0.43 |

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|--|--|-----------------------------------|--|-------------------------|-------------------------------------|-----------------|-----------------------------------|
| COMMON SPACE-BY-SPACE TYPES^a | LPD | LPD | LPD | LPD | LPD | LPD | LPD |
| Loading dock, interior | 0.38 | | 0.38 | | 0.38 | 0.34 | 0.38 |
| Lobby | | | | | | | |
| In a facility for the visually impaired (and not used primarily by the staff) ^b | 1.44 | | 1.44 | 2.49 | 1.44 | 1.30 | 1.44 |
| For an elevator | 0.51 | | 0.51 | 0.71 | 0.51 | 0.46 | 0.90 |
| In a hotel | 0.85 | exception/w | 0.51 | 0.51 | 0.51 | 0.68 | 0.85 |
| In a motion picture theater | 0.42 | 0.82 | 0.23 | 0.23 | 0.23 | 0.38 | 0.42 |
| In a performing arts theater | 1.60 | 1.08 | 1.25 | 1.25 | 1.25 | 0.82 | 1.44 |
| Otherwise | 0.72 | 0.85 | 0.72 | 1.11 | 0.72 | 0.65 | 0.86 |
| Locker room | 0.48 | 0.45 | 0.86 | 0.52 | 0.48 | 0.45 | 0.60 |
| Lounge/breakroom | | | | | | | |
| In a healthcare facility | 0.74 | | 0.58 | 0.42 | 0.42 | 0.53 | 0.74 |
| Otherwise | 0.58 | 0.65 | 0.58 | 0.59 | 0.58 | 0.44 | 0.69 |
| Office | | | | | | | |
| Enclosed | 0.89 | 0.70 | 0.88 | 0.88 | 0.88 | 0.80 | 0.85 |
| Enclosed <250 | | 0.70 | 0.88 | 0.88 | | | 0.88 |
| Enclosed >250 | | 0.65 | 0.79 | 0.79 | | | 0.79 |
| Open plan | 0.78 | 0.60 | 0.67 | 0.67 | 0.67 | 0.70 | 0.67 |
| Parking area, interior | 0.14 | 0.10 | 0.15 | 0.15 | 0.14 | 0.11 | 0.14 |
| Pharmacy area | 0.91 | 1.10 | 1.23 | 1.90 | 0.91 | 0.82 | 1.23 |
| Restroom | | | | | | | |
| In a facility for the visually impaired (and not used primarily by the staff) ^b | 0.96 | | 0.96 | 1.26 | 0.96 | 0.81 | 0.96 |
| Otherwise | 0.78 | 0.65 | 0.75 | 0.63 | 0.63 | 0.70 | 0.78 |
| Sales area | 1.22 | 1.00 | 1.12 | 1.12 | 1.12 | 1.06 | 1.22 |
| Seating area, general | 0.42 | | 0.23 | 0.23 | 0.23 | 0.38 | 0.38 |
| Stairway (see space containing stairway) | | | | | | | |
| Stairwell | 0.55 | 0.50 | 0.49 | 0.49 | 0.49 | 0.50 | 0.55 |
| Storage room | | | | | | | |
| < 50 SF | 0.46 | 0.42 | 0.40 | 0.40 | 0.40 | 0.45 | 0.86 |
| 50SF-1000SF | 0.46 | 0.42 | 0.38 | 0.38 | 0.38 | 0.43 | 0.46 |
| All other Storage | 0.46 | 0.42 | 0.38 | 0.38 | 0.38 | 0.43 | 0.46 |
| Vehicular maintenance | 0.54 | | 0.54 | 0.60 | 0.54 | 0.49 | 0.54 |
| Workshop | 1.14 | 0.86 | 1.14 | 1.26 | 1.14 | 1.09 | 1.14 |
| BUILDING SPECIFIC SPACE-BY-SPACE TYPES^a | | | | | | | |
| Automotive - (See Vehicular maintenance, above) | 0.54 | 0.55 | 0.54 | 0.60 | 0.54 | 0.49 | 0.53 |
| Convention center – exhibit space | 0.88 | | 0.50 | 0.50 | 0.50 | 0.69 | 0.88 |
| Dormitory living quarters | 0.30 | | 0.46 | 0.84 | 0.30 | 0.27 | 0.84 |
| Facility for the visually impaired ^b | | | | | | | |
| In a chapel (and not used primarily by the staff) ^b | 1.06 | | 0.70 | 0.70 | 0.70 | 0.89 | 1.77 |
| In a recreation room (and not used primarily by the staff) ^b | 1.80 | | 1.77 | 1.77 | 1.77 | 1.53 | 1.93 |
| Fire stations -- Sleeping quarters | 0.18 | | 0.18 | 0.20 | 0.18 | 0.18 | 0.18 |
| Engine rooms | 0.45 | not have this category | | | | | 0.45 |
| Gymnasium/fitness center | | 0.50 | | | | | |
| In an exercise area | 0.50 | 0.50 | 0.50 | 0.90 | 0.50 | 0.50 | 0.90 |
| In a playing area | 0.82 | 0.50 | 0.82 | 0.85 | 0.82 | 0.75 | 0.82 |
| Health care facility | | | | | | | |
| deleted AFAIK | | | | | | | |

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|--|--|-----------------------------------|--|-------------------------|-------------------------------------|-----------------|-----------------------------------|
| COMMON SPACE-BY-SPACE TYPES^a | LPD | LPD | LPD | LPD | LPD | LPD | LPD |
| In an exam/treatment room | 1.33 | 1.15 | 1.33 | 1.40 | 1.33 | 1.16 | 1.33 |
| In an imaging room | 1.06 | 1.00 | 0.85 | 0.85 | 0.85 | 0.98 | 1.06 |
| In a medical supply room | 0.54 | 0.55 | 0.54 | 0.62 | 0.54 | 0.54 | 0.54 |
| In a nursery | 0.70 | 0.95 | 0.94 | 1.37 | 0.70 | 0.70 | 0.94 |
| In a nurse's station | 0.57 | 0.75 | 0.75 | 1.11 | 0.57 | 0.57 | 0.75 |
| In an operating room | 1.51 | 1.90 | 1.90 | 2.26 | 1.51 | 1.51 | 2.17 |
| In a patient room | 0.50 | 0.55 | 0.68 | 0.68 | 0.50 | 0.45 | 1.33 |
| In a physical therapy room | 0.73 | 0.85 | 0.85 | 0.91 | 0.73 | 0.73 | 0.73 |
| In a recovery room | 0.92 | 0.90 | 0.92 | 1.25 | 0.92 | 0.89 | 0.92 |
| deleted AFAIK | | | | | | | |
| deleted AFAIK | | | | | | | |
| deleted sub-cat see guest rooms | | | | | | | |
| Library | | | | | | | |
| deleted AFAIK | | | | | | | |
| In a reading area | 0.74 | 0.80 | 0.80 | 0.96 | 0.74 | 0.67 | 0.96 |
| In the stacks | 1.20 | 1.10 | 1.16 | 1.16 | 1.16 | 1.08 | 1.16 |
| Manufacturing facility | | | | | | | |
| In a detailed manufacturing area | 0.93 | 0.85 | 0.80 | 0.80 | 0.80 | 0.86 | 1.03 |
| In an equipment room | 0.59 | 0.65 | 0.65 | 0.76 | 0.59 | 0.53 | 0.76 |
| In an extra high bay area (greater than 50-foot floor-to-ceiling height) | 0.84 | | 0.84 | 1.42 | 0.84 | 0.73 | 1.42 |
| In a high bay area (25 - 50-foot floor-to-ceiling height) | 0.75 | 0.65 | 0.75 | 1.24 | 0.75 | 0.58 | 1.24 |
| In a low bay (< 25-foot floor-to-ceiling height) | 0.95 | | 0.86 | 0.86 | 0.86 | 0.61 | 0.86 |
| Museum | | | | | | | |
| In a general exhibition area | 0.84 | 0.60 | 0.31 | 0.31 | 0.31 | 0.61 | 0.84 |
| In a restoration room | 0.82 | 0.75 | 1.10 | 1.10 | 0.82 | 0.74 | 0.82 |
| performing arts theater Dressing/fitting room | 0.32 | | 0.41 | 0.41 | 0.32 | 0.29 | 0.32 |
| Post office | | | | | | | |
| Sorting area | 0.68 | | 0.68 | 0.76 | 0.68 | 0.66 | 0.68 |
| Religious buildings | | | | | | | |
| In a fellowship hall | 0.51 | | 0.51 | 0.54 | 0.51 | 0.42 | 0.51 |
| In a worship/pulpit/choir | 1.22 | 0.95 | 0.85 | 0.85 | 0.85 | 0.98 | 1.22 |
| Retail facilities | | | | | | | |
| In a dressing/fitting room | 0.50 | 0.60 | 0.50 | 0.51 | 0.50 | 0.49 | 0.50 |
| In a mall concourse | 0.88 | 0.79 | 0.88 | 1.03 | 0.88 | 0.79 | 0.88 |
| Sports arena – playing area | | | | | | | |
| –For a Class 1 facility | 2.41 | 2.26 | 2.41 | 2.94 | 2.41 | 2.17 | 2.94 |
| For a Class 2 facility | 1.54 | 1.45 | 2.01 | 2.01 | 1.54 | 1.39 | 2.01 |
| For a Class 3 facility | 0.96 | 1.08 | 0.96 | 1.30 | 0.96 | 0.86 | 1.08 |
| For a Class 4 facility | 0.58 | 0.72 | 0.72 | 0.86 | 0.58 | 0.52 | 0.72 |
| deleted AFAIK | | | | | | | |

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|--|--|-----------------------------------|--|-------------------------|-------------------------------------|-----------------|-----------------------------------|
| COMMON SPACE-BY-SPACE TYPES^a | LPD | LPD | LPD | LPD | LPD | LPD | LPD |
| Transportation | | | | | | | |
| In a baggage/carousel area | 0.42 | 0.40 | 0.39 | 0.39 | 0.39 | 0.38 | 0.42 |
| In an airport concourse deleted - see "Seating Area general | 0.29 | | 0.25 | 0.25 | 0.25 | 0.22 | 0.29 |
| At a terminal ticket counter | 0.62 | | 0.51 | 0.51 | 0.51 | 0.48 | 0.62 |
| Warehouse – storage area | | | | | | | |
| For medium to bulky palletized items | 0.35 | 0.45 | 0.33 | 0.33 | 0.33 | 0.27 | 0.35 |
| For smaller, hand-carried items | 0.69 | 0.45 | 0.69 | 0.69 | 0.69 | 0.65 | 0.69 |

| | WSEC 2015 | 90.1-2016 | Propose? |
|----------------|-----------|-----------|----------|
| Area Allowance | 500 | 1000 | 500 |
| Retail 1 | 0.6 | 0.45 | 0.45 |
| Retail 2 | 0.6 | 0.45 | 0.45 |
| Retail 3 | 1.4 | 1.05 | 1.05 |
| Retail 4 | 2.5 | 1.88 | 1.88 |

| | WSEC 2006 | WSEC 2015 | | | | ASHRAE 90.1-2016 | | | | Ratio 90.1 to wsec 2015 | | | |
|--|-----------|-----------|--------|--------|--------|------------------|--------|--------|--------|-------------------------|--------|--------|--------|
| | | Zone 1 | Zone 2 | Zone 3 | Zone 4 | Zone 1 | Zone 2 | Zone 3 | Zone 4 | Zone 1 | Zone 2 | Zone 3 | Zone 4 |
| Base Site Allowance | | 500 | 600 | 750 | 1300 | 350 | 400 | 500 | 900 | 0.70 | 0.67 | 0.67 | 0.69 |
| Tradable | | | | | | | | | | | | | |
| Parking areas and drives | 0.15 | 0.04 | 0.06 | 0.08 | 0.1 | 0.03 | 0.04 | 0.06 | 0.08 | 0.75 | 0.67 | 0.75 | 0.80 |
| Walkways less than 10 feet wide | 1.0 | 0.7 | 0.7 | 0.8 | 1 | 0.5 | 0.5 | 0.6 | 0.7 | 0.71 | 0.71 | 0.75 | 0.70 |
| walkways > 10 feet wide, plazas | 0.2 | 0.14 | 0.14 | 0.16 | 0.2 | 0.1 | 0.1 | 0.11 | 0.14 | 0.71 | 0.71 | 0.69 | 0.70 |
| Stairways | 1.0 | 0.75 | 1 | 1 | 1 | 0.6 | 0.7 | 0.7 | 0.7 | 0.80 | 0.70 | 0.70 | 0.70 |
| Pedestrian Tunnels | | 0.15 | 0.15 | 0.2 | 0.3 | 0.12 | 0.12 | 0.14 | 0.21 | 0.80 | 0.80 | 0.70 | 0.70 |
| Landscaping | | | | | | 0.03 | 0.04 | 0.04 | 0.04 | | | | |
| Main Entries | 30 | 20 | 20 | 30 | 30 | 14 | 14 | 21 | 21 | 0.70 | 0.70 | 0.70 | 0.70 |
| Other doors | 20 | 20 | 20 | 20 | 20 | 14 | 14 | 21 | 21 | 0.70 | 0.70 | 1.05 | 1.05 |
| Loading docks | | | | | | 0.35 | 0.35 | 0.35 | 0.35 | | | | |
| Entry canopies | 1.25 | 0.25 | 0.25 | 0.4 | 0.4 | 0.2 | 0.25 | 0.4 | 0.4 | 0.80 | 1.00 | 1.00 | 1.00 |
| Sales Canopy - free standing and attached | | 0.6 | 0.6 | 0.8 | 1 | 0.4 | 0.4 | 0.6 | 0.7 | 0.67 | 0.67 | 0.75 | 0.70 |
| Outdoor sales - open areas | 0.5 | 0.25 | 0.25 | 0.5 | 0.7 | 0.2 | 0.2 | 0.35 | 0.5 | 0.80 | 0.80 | 0.70 | 0.71 |
| street frontage for vehicle sales lots | 20 | 0 | 10 | 10 | 30 | 0 | 7 | 7 | 21 | 1.00 | 0.70 | 0.70 | 0.70 |
| Nontradable | | | | | | | | | | | | | |
| Building facades per SF(WSEC is all, 90.1 is illuminated, 90.1-2016 is unchanged from previous 2013 values) | 0.2 | 0 | 0.075 | 0.113 | 0.15 | 0 | 0.1 | 0.15 | 0.2 | 1.00 | 1.33 | 1.33 | 1.33 |
| Building facades per LF | 5.0 | | | | | 0 | 2.5 | 3.75 | 5 | | | | |
| Automated teller location | 270 | 270 | 270 | 270 | 270 | 135 | 135 | 135 | 135 | 0.50 | 0.50 | 0.50 | 0.50 |
| Automated teller per machine | 90 | 90 | 90 | 90 | 90 | 45 | 45 | 45 | 45 | 0.50 | 0.50 | 0.50 | 0.50 |
| Entrances and gate house inspection stations | 1.25 | 0.75 | 0.75 | 0.75 | 0.75 | 0.5 | 0.5 | 0.5 | 0.5 | 0.67 | 0.67 | 0.67 | 0.67 |
| Loading areas for public safety | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.35 | 0.35 | 0.35 | 0.35 | 0.70 | 0.70 | 0.70 | 0.70 |
| Drive-up windows and doors | 400 | 400 | 400 | 400 | 400 | 200 | 200 | 200 | 200 | 0.50 | 0.50 | 0.50 | 0.50 |
| Parking near 24-hour retail entrance | 800 | 800 | 800 | 800 | 800 | 400 | 400 | 400 | 400 | 0.50 | 0.50 | 0.50 | 0.50 |

| | | | | | |
|-----------------------------|---|-----|-----------------------------|-----|--|
| Religious building | Q | 147 | Religious building | | |
| In a kitchen full | | 148 | In a kitchen full | 148 | |
| In a workshop/repair shop | | 149 | In a workshop/repair shop | 149 | |
| Retail facilities | | 150 | Retail facilities | 150 | |
| In a shopping mall | | 151 | In a shopping mall | 151 | |
| In a mall/concourse | | 152 | In a mall/concourse | 152 | |
| Sports arena - stadium area | Q | 153 | Sports arena - stadium area | | |
| -for a class 1 facility | | 154 | -for a class 1 facility | 154 | |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------|-------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| ICC 2018 | 0.784138717 | 0.84291 | 0.85726 | 0.95479 | 0.87207 | 0.77942 | 0.82549 | 0.80041 | 0.61611 | 0.63129 | 0.60118 | 0.71983 | 0.77553 | 0.75937 | 1.06719 | 0.54483 | 0.8026 | 0.70219 | 0.53881 | 0.82884 | 0.76344 | 0.17138 | 0.79787 | 0.77972 | 0.72089 | 1.05246 | 0.8465 | 0.798 | 0.67656 | 1.16549 | 0.71971 | 0.70642 | 0.65848 | 0.46031 | 0.88065 |
| ASHRAE 90.1 2010 | 0.78505033 | 0.84321 | 0.85726 | 0.95479 | 0.87207 | 0.77942 | 0.82549 | 0.80041 | 0.61611 | 0.63129 | 0.60118 | 0.71983 | 0.77553 | 0.75937 | 1.06719 | 0.54483 | 0.8026 | 0.70219 | 0.53881 | 0.82884 | 0.76344 | 0.17138 | 0.79787 | 0.77972 | 0.72089 | 1.05246 | 0.8465 | 0.798 | 0.67656 | 1.16549 | 0.71971 | 0.70642 | 0.65848 | 0.46031 | 0.88065 |
| International Green Building | 0.789939389 | 0.85649 | 0.91912 | 0.83886 | 0.81101 | 0.70125 | 0.77176 | 0.75983 | 0.4461 | 0.52091 | 0.50992 | 0.80926 | 0.84219 | 0.81101 | 0.91919 | 0.92994 | 0.78877 | 0.84779 | 0.46674 | 0.80814 | 0.70927 | 0.17427 | 0.7401 | 0.78188 | 0.81225 | 1.03816 | 0.84112 | 0.73027 | 0.58964 | 1.02049 | 0.60486 | 0.71077 | 0.59675 | 0.47476 | 0.87379 |
| Seattle 2018 | 0.67528214 | 0.60051 | 0.61116 | 0.78022 | 0.77189 | 0.64576 | 0.67168 | 0.61061 | 0.44101 | 0.48761 | 0.50455 | 0.71124 | 0.64698 | 0.47776 | 0.89479 | 0.92924 | 0.78877 | 0.84779 | 0.46674 | 0.7511 | 0.64109 | 0.17262 | 0.68216 | 0.68108 | 0.64683 | 0.97706 | 0.7811 | 0.72884 | 0.88989 | 1.00829 | 0.51045 | 0.4801 | 0.50207 | 0.47461 | 0.81647 |
| Seattle 2018 - IECC | 0.663704213 | 0.59676 | 0.58428 | 0.78239 | 0.75987 | 0.64589 | 0.68111 | 0.64603 | 0.42609 | 0.48174 | 0.48866 | 0.64647 | 0.47001 | 0.87244 | 0.91028 | 0.78972 | 0.84827 | 0.81028 | 0.45124 | 0.74229 | 0.64089 | 0.17244 | 0.64821 | 0.67028 | 0.64793 | 0.97855 | 0.77928 | 0.78193 | 0.91923 | 0.92928 | 0.51011 | 0.48889 | 0.54908 | 0.44921 | 0.81644 |
| 189.1 | 0.684428129 | 0.61841 | 0.59041 | 0.79217 | 0.74181 | 0.64521 | 0.68101 | 0.61011 | 0.42601 | 0.48171 | 0.48861 | 0.64641 | 0.47001 | 0.87241 | 0.91021 | 0.78971 | 0.84821 | 0.81021 | 0.45121 | 0.74221 | 0.64081 | 0.17241 | 0.64821 | 0.67021 | 0.97851 | 0.77921 | 0.78191 | 0.91921 | 0.92921 | 0.51011 | 0.48881 | 0.54901 | 0.44921 | 0.81641 | |
| ASHRAE 90.1 Add | 0.649434624 | 0.6421 | 0.61721 | 0.67613 | 0.70642 | 0.75897 | 0.61171 | 0.61412 | 0.71227 | 0.74791 | 0.57308 | 0.7547 | 0.64941 | 0.67237 | 1.02132 | 0.90471 | 0.80915 | 0.64776 | 0.41113 | 0.51447 | 0.68553 | 0.18008 | 0.69546 | 0.6868 | 0.73979 | 0.97792 | 0.71581 | 0.67974 | 0.62474 | 0.86411 | 0.61401 | 0.67744 | 0.56445 | 0.41311 | 0.82195 |
| 90.1 Additions/MS | 0.649000075 | 0.64212 | 0.67061 | 0.67119 | 0.70481 | 0.67709 | 0.61019 | 0.64417 | 0.62011 | 0.61411 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 |
| Basin Process | 0.649306221 | 0.63971 | 0.70761 | 0.68426 | 0.68489 | 0.68301 | 0.60709 | 0.60425 | 0.4111 | 0.48074 | 0.48006 | 0.64435 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 | 0.61011 |
| Basin Process | 0.748690463 | 0.61021 | 0.78116 | 0.64177 | 0.64646 | 0.74646 | 0.71944 | 0.7161 | 0.70719 | 0.71613 | 0.64613 | 0.70466 | 0.70466 | 0.70466 | 0.70466 | 0.70466 | 0.70466 | 0.70466 | 0.70466 | 0.70466 | 0.70466 | 0.70466 | 0.70466 | 0.70466 | 0.70466 | 0.70466 | 0.70466 | 0.70466 | 0.70466 | 0.70466 | 0.70466 | 0.70466 | 0.70466 | 0.70466 | 0.70466 |
| Basin of CI and Inlet | 0.61010884 | 0.64111 | 0.59051 | 0.61291 | 0.62044 | 0.70071 | 0.72564 | 0.70346 | 0.64649 | 0.62116 | 0.50813 | 0.69716 | 0.66862 | 0.68899 | 0.80776 | 0.90326 | 0.8012 | 0.64671 | 0.46319 | 0.79971 | 0.67948 | 0.17385 | 0.72415 | 0.71498 | 0.68839 | 1.0359 | 0.81314 | 0.75585 | 0.52042 | 1.02011 | 0.59207 | 0.69123 | 0.59129 | 0.47171 | 0.87192 |

