



# AGENDA

## STAFF PRESENTATIONS

### PUBLIC COMMENT

## SHORELINE CITY COUNCIL VIRTUAL/ELECTRONIC SPECIAL MEETING

Monday, November 15, 2021  
5:45 p.m.

Held Remotely on Zoom  
<https://us02web.zoom.us/j/87967120440>  
253-215-8782 | Meeting ID: 879 6712 0440

**TOPIC/GUESTS:** EXECUTIVE SESSION: Personnel RCW 42.30.110(1)(g)

## SHORELINE CITY COUNCIL VIRTUAL/ELECTRONIC REGULAR MEETING

Monday, November 15, 2021  
7:00 p.m.

Held Remotely on Zoom  
<https://zoom.us/j/95015006341>

In an effort to curtail the spread of the COVID-19 virus, the City Council meeting will take place online using the Zoom platform and the public will not be allowed to attend in-person. You may watch a live feed of the meeting online; join the meeting via Zoom Webinar; or listen to the meeting over the telephone. The City Council is providing opportunities for public comment by submitting written comment or calling into the meeting to provide oral public comment. To provide oral public comment you must sign-up by 6:30 p.m. the night of the meeting. Please see the information listed below to access all of these options:



[Click here to watch live streaming video of the Meeting on shorelinewa.gov](#)



Attend the Meeting via Zoom Webinar: <https://zoom.us/j/95015006341>



Call into the Live Meeting: 253-215-8782 | Webinar ID: 950 1500 6341



[Click Here to Sign-Up to Provide Oral Testimony](#)

*Pre-registration is required by 6:30 p.m. the night of the meeting.*



[Click Here to Submit Written Public Comment](#)

*Written comments will be presented to Council and posted to the website if received by 4:00 p.m. the night of the meeting; otherwise they will be sent and posted the next day.*

	<u>Page</u>	<u>Estimated Time</u>
1. CALL TO ORDER		7:00
2. ROLL CALL		
(a) Proclamation of America Recycles Day	<u>2a-1</u>	
3. APPROVAL OF THE AGENDA		
4. REPORT OF THE CITY MANAGER		

**5. COUNCIL REPORTS**

**6. PUBLIC COMMENT**

*Members of the public may address the City Council on agenda items or any other topic for three minutes or less, depending on the number of people wishing to speak. The total public comment period will be no more than 30 minutes. If more than 10 people are signed up to speak, each speaker will be allocated 2 minutes. Please be advised that each speaker's testimony is being recorded. Speakers are asked to sign up by 6:30 p.m. the night of the meeting via the [Remote Public Comment Sign-in form](#). Individuals wishing to speak to agenda items will be called to speak first, generally in the order in which they have signed up.*

**7. CONSENT CALENDAR**

- (a) Authorizing the City Manager to Enter into a Funding Agreement with the Central Puget Sound Regional Transit Authority (Sound Transit) for the City of Shoreline SR 523 (N/NE 145th Street) & I-5 Interchange Project 7a-1

**8. ACTION ITEMS**

- (a) Action on Ordinance No. 945 - Amending the 2021-2022 Biennial Budget as Amended, According to the Mid-Biennium Budget Modification 8a-1 7:20
- (b) Action on Ordinance No. 946 – Setting the 2022 Regular Property Tax Levy 8b-1 7:35
- (c) Action on Ordinance No. 947 – Setting the 2022 Fee Schedule for Impact Fees 8c-1 7:45
- (d) Action on Resolution No. 484 – Setting the 2022 Fee Schedule 8d-1 7:55

**9. STUDY ITEMS**

- (a) Discussion of Ordinance No. 948 – Amending the Washington State Energy Code, as adopted by Shoreline Municipal Code Chapter 15.05, to Reduce Carbon Emissions from New Commercial Construction 9a-1 8:05

**10. ADJOURNMENT** 8:45

*Any person requiring a disability accommodation should contact the City Clerk's Office at 206-801-2230 in advance for more information. For TTY service, call 206-546-0457. For up-to-date information on future agendas, call 206-801-2230 or visit the City's website at [shorelinewa.gov/councilmeetings](http://shorelinewa.gov/councilmeetings). Council meetings are shown on the City's website at the above link and on Comcast Cable Services Channel 21 and Ziplly Fiber Services Channel 37 on Tuesdays at 12 noon and 8 p.m., and Wednesday through Sunday at 6 a.m., 12 noon and 8 p.m.*

**CITY COUNCIL AGENDA ITEM**  
CITY OF SHORELINE, WASHINGTON

<b>AGENDA TITLE:</b>	Proclamation of America Recycles Day		
<b>DEPARTMENT:</b>	Recreation, Cultural, and Community Services Department		
<b>PRESENTED BY:</b>	Cameron Reed, Environmental Program Specialist		
<b>ACTION:</b>	<input type="checkbox"/> Ordinance	<input type="checkbox"/> Resolution	<input type="checkbox"/> Motion
	<input type="checkbox"/> Discussion	<input type="checkbox"/> Public Hearing	<input checked="" type="checkbox"/> Proclamation

**PROBLEM/ISSUE STATEMENT:**

This proclamation recognizes November 15, 2021, as America Recycles Day in the City of Shoreline. Throughout the month of November, it calls upon residents and businesses to learn more about waste reduction and recycling options and commit to recycle more materials every day of the year.

America Recycles Day encourages everyone in our community to conserve resources and protect our environment by reducing waste; recycling and reusing materials; and purchasing items made from recycled materials.

The Shoreline community is strongly supportive of recycling and efforts to reduce waste. Fourteen local businesses have earned EnviroStars recognition for their recycling practices and efforts to reduce waste. 12 public and private Shoreline schools participate in the King County Green Schools programs, working to advance recycling and resource conservation opportunities on their campuses. Lastly, Shoreline residents frequently participate in a wide range of drop-off recycling and product stewardship programs for difficult items such as Styrofoam, plastic film, electronics, and batteries.

We can each help create a sustainable community by following these examples to reduce the amount of waste we create and recycle as much as possible.

**RECOMMENDATION**

Staff recommends that Mayor Hall read the America Recycles Day Proclamation.

**ATTACHMENT:**

Attachment A – America Recycles Day 2021 Proclamation

Approved By: City Manager **DT** City Attorney **MK**



## **PROCLAMATION**

WHEREAS, a healthy natural environment is the foundation of a vigorous society and a robust economy; and

WHEREAS, the City encourages the protection of our natural resources and the adoption of habits that promote a sustainable environment; and

WHEREAS, Shoreline residents and businesses recycle 48 percent of all solid waste generated, yet 70 percent of what is still landfilled could have been reused, recycled or composted, we must continue to focus on initiatives such as waste reduction, composting, the reuse of product and materials, and purchasing recycled products; and

WHEREAS, community members and organizations can be leaders in waste reduction and recycling; and

WHEREAS, America Recycles Day offers every individual an opportunity to actively reduce waste, recycle and protect our natural resources;

NOW, THEREFORE, I, Will Hall, Mayor of the City of Shoreline, on behalf of the Shoreline City Council, do hereby proclaim November 15, 2021, as

## **AMERICA RECYCLES DAY**

in the City of Shoreline and call upon all residents to celebrate this special occasion by thanking their fellow community members and businesses for their hard work and significant contribution in reducing, reusing, and recycling and protecting our environment.

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Will Hall, Mayor

**CITY COUNCIL AGENDA ITEM**  
CITY OF SHORELINE, WASHINGTON

<b>AGENDA TITLE:</b>	Authorizing the City Manager to Enter into a Funding Agreement with the Central Puget Sound Regional Transit Authority (Sound Transit) for the City of Shoreline SR 523 (N/NE 145th Street) & I-5 Interchange Project
<b>DEPARTMENT:</b>	Public Works
<b>PRESENTED BY:</b>	Nytasha Walters, Transportation Services Manager
<b>ACTION:</b>	<input type="checkbox"/> Ordinance <input type="checkbox"/> Resolution <input checked="" type="checkbox"/> Motion <input type="checkbox"/> Discussion <input type="checkbox"/> Public Hearing

**PROBLEM/ISSUE STATEMENT:**

The City of Shoreline has been working closely with the Central Puget Sound Regional Transit Authority (Sound Transit) to bring light rail to Shoreline and provide/coordinate improvements on the 145th Street Corridor. Two key projects are the Sound Transit State Route 522 / NE 145th Street Bus Rapid Transit (BRT) Project and the City of Shoreline State Route 523 (N/NE 145th Street) & Interstate-5 Interchange Improvements (Interchange) Project.

Recognizing that the City Interchange Project will provide for BRT operational improvements (including transit priority metering), reduce capital costs to Sound Transit over the alternative signal Improvement project, and provide pedestrian access and safety benefits, Sound Transit confirmed interest in providing a financial contribution that reflects the benefits to Sound Transit riders that the Interchange Project will provide.

This collaboration was formalized in a Partnering Agreement between Sound Transit and the City that was executed on January 12, 2021. The Partnering Agreement outlines the roles and responsibilities for each party in implementing these projects. The final component of this partnership is to execute a Funding Agreement. This Agreement, which provides for a \$10 million contribution from Sound Transit to the Interchange Project, has been developed and is attached to this staff report as Attachment A. Tonight, staff is seeking Council authorization for the City Manager to enter into this Funding Agreement with Sound Transit.

**RESOURCE/FINANCIAL IMPACT:**

This Funding Agreement commits Sound Transit to a \$10 million funding obligation for the Interchange Project which will be utilized in the right-of-way and construction phases. Although the City has secured Federal Highway Administration (FHWA) funding, Regional Mobility State funding, and pending State Transportation Improvement Board (TIB) funding (application was submitted this summer and

successful candidates will be announced late fall), the City would not be financially able to move the Interchange Project forward through construction without these Sound Transit funds.

**RECOMMENDATION**

Staff recommends that the City Council authorize the City Manager to enter into the Funding Agreement with Sound Transit for financial contribution to the Interchange Project.

Approved By:           City Manager ***DT***   City Attorney ***MK***

## **INTRODUCTION**

Since Sound Transit established that its Lynnwood Link Extension (LLE) project would be constructing two light rail stations in the City of Shoreline (City), both agencies have been working closely together on projects that would provide access to the future Shoreline South/148<sup>th</sup> light rail station. Sound Transit is designing and will construct their BRT Project improvements (providing bus rapid transit from the station, along 145<sup>th</sup> Street east of I-5 to SR 522 then north/ northeast to the cities of Shoreline, Seattle, Lake Forest Park, Kenmore, and Bothell) and the City is designing and will construct the Interchange Project with a pair of roundabouts to improve safety, efficiency, and access.

The Interchange Project improvements are beneficial to the operation of the Sound Transit BRT Project and mitigates improvements that Sound Transit may have otherwise had to implement for the BRT Project and the LLE project. Acknowledging this, Sound Transit committed to a financial partnership with the City which was memorialized in a Partnering Agreement executed on January 12, 2021. The attached Funding Agreement (Attachment A) is the final piece of this partnership, providing specifics on the \$10 million that Sound Transit will contribute to the Interchange Project.

## **BACKGROUND**

The City has been collaborating with Sound Transit over the last few years on key projects in the vicinity of the future Shoreline South/148<sup>th</sup> Station. Early on, Sound Transit recognized the benefits that improvements at the interchange will provide to both their light rail and BRT projects.

On April 22, 2020, Sound Transit and the City co-signed a Letter of Concurrence which outlined the scope of the proposed BRT Project within the City of Shoreline and described a Sound Transit funding contribution of up to \$10 million for the Interchange Project as recognition of the mutual benefits the Interchange Project was providing. This Letter of Concurrence allowed the City to move forward with the Interchange Project seeking additional funding with the confidence that Sound Transit would be providing the crucial matching funds to secure federal and state funding.

With the Letter of Concurrence in place, both parties began work on a Partnering Agreement which laid out basic project management, decision making, responsibilities, and process elements for project delivery. This Partnering Agreement was brought before Council in a [staff report at the November 9, 2020 Council meeting](#) and was executed on January 12, 2021.

The attached Funding Agreement is a final step in safeguarding a Sound Transit financial commitment. This agreement sets forth the terms and conditions for Sound Transit's contribution of up to \$10 million in funding for the Interchange Project. Originally anticipated to be finalized and presented to the Sound Transit Board in early 2021, funding shortfalls resulted in delays and Board discussions on which projects to move forward with adjusted schedules. Shoreline has worked closely with Sound Transit staff to keep the BRT Project moving forward with a slight delay, now expected to be operational in 2026. Staff is asking that Council authorize the City Manager to

sign this Funding Agreement so that it may go before the Sound Transit Board on November 18, 2021.

**DISCUSSION**

The City has been actively seeking funding to complete the Interchange Project since its inception. The \$10 million in funding from Sound Transit should provide close to complete funding of the Interchange Project if a pending Transportation Improvement Board (TIB) funding application submitted this summer is successful. TIB will announce successful candidates in late fall. If successful, the Interchange Project will have the following funding in place:

<b>Revenue Source</b>	<b>Amount (\$)</b>	<b>Phase</b>
Roads Capital Fund	\$ 1,039,000	Design
Federal STP	\$ 3,892,500	Design
TIB ( <i>pending</i> )	\$ 5,000,000	ROW & Construction
Federal STP	\$ 4,920,000	Construction
Sound Transit	\$ 10,000,000	Available for all phases
Regional Mobility	\$ 5,000,000	ROW & Construction
<b>Total</b>	<b>\$ 29,851,500</b>	

This represents just under \$30 million in secured revenue (again, pending the TIB results). The total project cost is currently estimated at approximately \$31 million. The difference between available revenue and the total project will be absorbed by adjustments to scope and coordination with the Sound Transit LLE project revisions.

In January 2021, when the City entered into the Partnership Agreement with Sound Transit outlining responsibilities for each party, it was in good faith that the Funding Agreement would also be executed at a later date. At the time, staff felt comfortable with this decision informing Sound Transit that should their Board decide not to execute a Funding Agreement, the City would not be able to move forward with the Interchange Project. If that were to occur, Sound Transit would be required to construct alternative, more expensive, and impactful road improvements on 145<sup>th</sup> Street in order to ensure their desired transit performance.

At this point, Sound Transit staff have assured City staff that the Board is scheduled to approve and execute this Funding Agreement at their November 18, 2021 meeting.

**COUNCIL GOAL(S) ADDRESSED**

Support of this BRT Project directly addresses Council Goal 3 to continue preparation for regional mass transit in Shoreline.

**RESOURCE/FINANCIAL IMPACT**

This Funding Agreement commits Sound Transit to a \$10 million maximum funding obligation for the Interchange Project which will be utilized in the right-of-way and construction phases. Although the City has secured Federal Highways Administration (FHWA) funding, Regional Mobility State funding, and pending State Transportation Improvement Board (TIB) funding (application was submitted this summer and successful candidates will be announced late fall), the City would not be in a financial place to move the Interchange Project forward through construction without these Sound Transit funds.



The Funding Agreement sets forth the terms and conditions for Sound Transit's financial contribution and participation in the Shoreline Interchange Project to support the Sound Transit BRT Project. It also sets forth the City's responsibility in developing and delivering the Interchange Project. Should the City at any point decide not to continue with construction of the Interchange Project, the City would be responsible in reimbursing any expended outside funding.

### **RECOMMENDATION**

Staff recommends that the City Council authorize the City Manager to enter into the Funding Agreement with Sound Transit for financial contribution to the Interchange Project.

### **ATTACHMENT**

Attachment A: Sound Transit and City of Shoreline Funding Agreement for the Interchange Project

**FUNDING AGREEMENT**  
**BETWEEN SOUND TRANSIT AND THE CITY OF SHORELINE**  
**FOR CONTRIBUTION TO THE INTERCHANGE PROJECT**

**GA XXXX-XX**

This agreement (“Agreement”) is between the Central Puget Sound Regional Transit Authority, a regional transit authority organized under RCW 81.112 (“Sound Transit”), and the City of Shoreline, a Washington municipal corporation (“City”), for the purposes set forth below. Sound Transit and the City are collectively referred to hereafter as the “Parties” or individually as a “Party.”

**RECITALS**

**WHEREAS**, Sound Transit is a regional transit authority created pursuant to Chapters 81.104 and 81.112 RCW with all powers necessary to implement a high capacity transit system within its boundaries in King, Pierce, and Snohomish Counties.

**WHEREAS**, the City is responsible for administering land use laws and development regulations that will apply to Sound Transit projects located within the City’s jurisdiction. The City is also responsible for managing public streets and municipal utilities within its jurisdiction and for providing municipal services, such as public safety.

**WHEREAS**, Sound Transit is implementing high capacity transit improvements and service along segments of SR 522/NE 145<sup>th</sup> Street, known as the SR 522/NE 145<sup>th</sup> Bus Rapid Transit Project (“SR 522/NE 145<sup>th</sup> BRT Project”).

**WHEREAS**, the purpose of the SR 522/NE 145<sup>th</sup> BRT Project is to establish bus rapid transit (BRT) connecting the Cities of Bothell, Kenmore, Lake Forest Park, Shoreline, and Seattle via State Route 522 and NE 145<sup>th</sup> Street and connecting the Lynnwood Link Extension (“LLE Project”) Shoreline South/148<sup>th</sup> light rail station to I-405 BRT in Bothell, which are other projects currently being implemented by Sound Transit.

**WHEREAS**, the City plans to construct a multi-lane roundabout interchange project at the NE 145<sup>th</sup> Street/I-5 Interchange (“Interchange Project”). The roundabout east of I-5 will include utility cabinet and subsurface infrastructure that supports traffic metering for bus priority (“Transit Priority Element”) that, once activated, will provide a benefit to bus operations. The City has issued a State Environmental Policy Act (SEPA) Determination of Non-significance (DNS) on October 15, 2021. The City plans to complete construction of the Interchange Project in 2024.

**WHEREAS**, the City and Sound Transit executed a Partnering Agreement on January 12, 2021 (“Partnering Agreement”) which outlines roles and responsibilities for both Parties to implement the SR 522/NE 145<sup>th</sup> BRT Project and provides guidance to implement the Interchange Project.

**WHEREAS**, Sound Transit has completed 30 percent design of the SR 522/NE 145<sup>th</sup> BRT Project and issued a SEPA DNS on March 21, 2021. Sound Transit plans to complete construction of BRT infrastructure prior to initiating BRT revenue service in 2026.

**WHEREAS**, Sound Transit supports the City’s proposal to complete the design and construction of the Interchange Project including the Transit Priority Element as it will provide for BRT operational improvements and includes pedestrian access and safety benefits.

**WHEREAS**, at the execution of this Agreement, the design for the Interchange Project has been partially funded by a U.S. Department of Transportation Surface Transportation Program (“STP”) grant. The City is seeking additional funding sources for the Interchange Project.

**WHEREAS**, the Parties intend to continue coordination and support for the Interchange Project grant proposals and similar funding efforts.

**WHEREAS**, Sound Transit staff and the City of Shoreline staff co-signed a concurrence letter on April 22, 2020 (“April Concurrence Letter”) that confirmed Sound Transit’s interest in providing a financial contribution to the Interchange Project that reflects to benefits of the roundabout project design to Sound Transit’s riders and the SR 522/NE 145<sup>th</sup> BRT Project, up to \$10 Million as potential match for grant applications.

**WHEREAS**, the Sound Transit Board identified the SR 522/NE 145<sup>th</sup> BRT Project to be built as described in Board Resolution R2021-07.

NOW, THEREFORE, in consideration of the terms and conditions set forth herein, the Parties agree to the following:

**AGREEMENT**

1. **Purpose.** This Agreement sets forth the terms and conditions for Sound Transit’s financial contribution and participation in the City of Shoreline’s proposed Interchange Project to support the SR 522/NE 145<sup>th</sup> BRT Project. It also sets forth the City of Shoreline’s responsibilities for developing and delivering the Interchange Project, which may include transferring responsibility to deliver the Interchange Project to the Washington State Department of Transportation (WSDOT).
2. **SR 522/NE 145<sup>th</sup> BRT Project Improvements.**
  - 2.1 The City agrees to support Sound Transit’s implementation of the SR 522/NE 145<sup>th</sup> BRT Project as described in Sound Transit Board Resolution R2021-07.
  - 2.2 Sound Transit Board Resolution R2021-07 identifies SR 522/NE 145<sup>th</sup> BRT Project improvements in the vicinity of the Interchange Project as a light rail connection at the Shoreline South/148<sup>th</sup> Light Rail Station, and a westbound Business Access and Transit (BAT) lane from 8<sup>th</sup> Avenue NE to 6<sup>th</sup> Avenue NE. Sound Transit has completed 30 percent design of these improvements, including frontage improvements of a twelve foot wide shared-use path and five foot wide planting strip between the eastern curb of 8<sup>th</sup> Avenue NE and the western curb of 6<sup>th</sup> Avenue NE and curb ramps

at intersections within those limits, as shown in Exhibit A. Sound Transit will not be constructing frontage improvements west of the western 6<sup>th</sup> Avenue NE curb return. Sound Transit intends to pursue City approval of design deviations for some of the SR 522/NE 145th BRT Project frontage improvements to minimize private property impacts and to accommodate other site constraints that will be consistent with Americans with Disabilities Act (ADA) standards and safe pedestrian and bicycle access goals. The City agrees it will timely consider the requested deviations in accordance with its applicable standards.

### **3. Interchange Project Improvements.**

- 3.1 The Interchange Project would replace two signalized intersections on the west (NE 145<sup>th</sup> Street/I-5 on-off ramps) and east (NE 145<sup>th</sup> Street/5<sup>th</sup> Avenue NE) sides of the overpass with multi-lane roundabouts, with a westbound transit priority meter for transit entering the roundabout. Roundabouts will eliminate the need for a center lane with left-turn pockets on the existing bridge deck and will allow reconfiguration of the bridge deck from a 5-lane to a 4-lane roadway. The space no longer required for the roadway will be repurposed as a shared pedestrian and bicycle path across the north side of the bridge, protected by raised curbs. The existing walkway on the south side of the bridge will be retained.
- 3.2 The LLE Project includes proposed improvements at the 5<sup>th</sup> Ave NE intersection that would be altered by the Interchange Project. To streamline the two projects, the turn lanes at NE 145<sup>th</sup> Street and 5<sup>th</sup> Ave NE, signal modifications and other items will be deleted or revised from the LLE Project and instead alternate intersection improvements will be included and constructed by the Interchange Project. The City's Interchange Project team and ST's LLE Project team will work together to identify revisions to the LLE project to determine the appropriate additions and deletions. These revisions will be documented separately between the two project teams.
- 3.3 The proposed SR 522/NE 145th BRT Project westbound BAT lane would merge into general purpose lanes in the vicinity of 6<sup>th</sup> Avenue NE. The Interchange Project would be designed to match up to the BRT Project curb locations and paving at 6<sup>th</sup> Avenue NE. The Interchange Project would provide infrastructure for a westbound Transit Priority Element at 6<sup>th</sup> Avenue NE and would include all roadway and frontage improvements on NE 145<sup>th</sup> Street west of the Transit Priority Element as shown in Exhibit A. The Transit Priority Element is the signal including all conduit, wiring, software and hardware necessary to make the signal operate to provide priority for buses in the BAT lane to enter the roundabout ahead of general-purpose traffic. The Transit Priority Element would be activated upon completion of the westbound BAT lane. It will then be operated consistent with provisions described in Section 4.3 of this agreement and documented in future operating agreements.
- 3.4 The Transit Priority Element will be designed by the City to communicate with buses so that a bus approaching the roundabout would be recognized and given priority access within the roundabout. ST is responsible to provide the City with the system requirements for the buses.

#### **4. Interchange Project Administration.**

- 4.1 The City is the “Lead Agency” for purposes of compliance with National Environmental Policy Act “NEPA” and State Environmental Policy Act “SEPA” as is determined to be required.
- 4.2 The City is responsible for fully coordinating and delivering the Project including securing funding, design, property acquisition, and construction of the Project. As part of the design, the City is responsible to coordinate and participate in the development and approval of an operations and maintenance agreement (O&M Agreement) between the City, WSDOT and the City of Seattle. Sound Transit will have no responsibility for ownership, operation or maintenance of any of the assets, including the Transit Priority Element. The City and Sound Transit will coordinate delivery schedules and construction sequencing to minimize additional cost or delay in either parties’ construction projects. The City is responsible for all construction activities within the limits of the interchange projects and ensuring it meets final inspection and acceptance requirements for WSDOT and other asset owners that are defined in the O&M Agreement. The City retains the right to contract any or all portions of the work for design and construction, including contracting with WSDOT.
- 4.2.1 The City agrees to ensure inclusion of apprenticeship and other small/disadvantaged business participation goals that are consistent with the intent of Sound Transit’s existing Project Labor Agreement in Interchange Project construction contracts, including those assigned to WSDOT. The City will ensure usage of LCP Tracker software or similar software to monitor compliance with the goals. Sound Transit will provide training and assistance to assigned staff to use the LCP Tracker software, if needed.
- 4.2.2 The City will ensure its contractors, including those assigned to WSDOT, shall be responsible for maintaining labor harmony on projects funded in whole or in part by this agreement. The City further agrees to insert language into all construction contracts funded in whole or in part by this funding agreement, that sets project-wide goals as follows: 20% of all hours worked, are to be worked by Washington State registered apprentices, 21% of all hours worked are to be worked by workers of color, and 12% of all hours worked are to be worked by women. Additionally, the City agrees to require all contractors, of every tier level, to utilize LCP Tracker to track, monitor and collect all workforce data through the collection of certified payroll information. Sound Transit will provide project level access to LCP Tracker, training on its use, assistance with information extraction, and electronic copies of the certified payrolls submitted by all contractors on the project. In addition, upon request, the Sound Transit Office of Labor Relations will assist in the effort to promote and maintain Labor Harmony on the portions of work covered by this funding agreement.
- 4.3 The O&M Agreement should address topics specific to Transit Priority Element operations such as transit priority, transit speed and reliability, intersection pedestrian and vehicle safety, and actions to avoid or mitigate negative impacts. The O&M Agreement for the Transit Priority Element may be set out in a separate agreement.
- 4.4 The City of Shoreline’s design will support the use of a transit priority meter that is compatible with a future Sound Transit corridor wide operation plans to support transit speed and

reliability. This plan will be developed in the future with the SR522/145th BRT project partners as the BRT systems requirements are developed.

4.5 The identification of the designated representatives and responsibilities of which for this Agreement are those identified and articulated in the Partnering Agreement.

**5. Funding, Invoicing and Payments.**

5.1 Sound Transit's funding obligation under this Agreement is ten million dollars (\$10,000,000.00).

5.2 The City will submit periodic invoices to Sound Transit during the various phases (design, ROW or construction) of the Interchange Project. Sound Transit will reimburse the City upon receipt of invoices from the City. The City may use Sound Transit funding as match for other grants, however, it is understood that there is no matching requirements related to the Sound Transit funding. The City may also program ST funding at its discretion so as to maximize all other funding sources, but will seek to expend grant sources prior to utilization of ST funds in each phase.

5.3 The City shall submit invoices no more frequently than quarterly and supporting documentation for payment of Sound Transit's contributions. The invoices must include the appropriate purchase order number, which will be provided by Sound Transit after execution of this Agreement, a cover memo as described in Exhibit B, and supporting documentation detailing the work completed and associated costs.

5.3.1 The City shall submit invoices with the required documentation via email to [AccountsPayable@SoundTransit.org](mailto:AccountsPayable@SoundTransit.org). Invoices are payable thirty days upon Sound Transit's receipt of the invoice and acceptable documentation.

5.3.2 Supporting documentation includes payroll logs, consultant/contractor/partner agency invoices, itemized details of other direct costs to the Interchange Project, or other documentation of Interchange Project costs.

5.3.3 Labor Compliance Documentation for the construction phase.

5.3.4 If Sound Transit determines that an invoice lacks sufficient documentation to support payment, Sound transit will notify the City of its determination and request that the City provide additional documentation. Sound transit may withhold payment for contested portions of the invoice until supporting documentation for the contested portions are provided, however such approval shall not be unreasonable withheld.

5.4 Sound Transit will withhold one hundred thousand dollars (\$100,000) from reimbursement until the Operations Agreement described in Section 4.3 has been executed.

**6. Termination.**

6.1 Sound Transit may terminate this Agreement if construction of the Traffic Priority Element is not completed before the expiration date of this Agreement as described in Section 11, unless otherwise mutually agreed by the Parties. If this Agreement is terminated under this subsection, the City shall reimburse Sound Transit the full amount of all payments associated with the incomplete

improvements made to the City pursuant to this Agreement within ninety (90) days of the date of termination.

6.2 Dispute Resolution Required. Before either Party may terminate this Agreement for cause, it must attempt to seek resolution through the dispute resolution process set forth in the Partnering Agreement.

6.3 Except as provided in this Section, a termination by either Party shall not extinguish or release the other Party from liability for costs or obligations existing as of the date of termination. Any costs incurred prior to proper notification of termination will be borne by the Parties in accordance with the terms of this Agreement.

**7. Indemnity.**

7.1 To the maximum extent permitted by law, the City will hold harmless from, and indemnify and defend Sound Transit (including its board members, officers, and employees) against claims, demands, losses, lawsuits, actions, or liability, relating to the City's design, construction, or operation of the capital improvements, including claims by the City's employees. **THE CITY SPECIFICALLY ASSUMES POTENTIAL LIABILITY FOR ACTIONS BROUGHT BY THE CITY'S OWN EMPLOYEES OR FORMER EMPLOYEES AGAINST ANY INDEMNIFIED PARTY, AND FOR THAT PURPOSE THE CITY SPECIFICALLY WAIVES ALL IMMUNITY AND LIMITATIONS ON LIABILITY UNDER THE WORKERS COMPENSATION ACT, RCW TITLE 51, OR ANY INDUSTRIAL INSURANCE ACT, DISABILITY BENEFIT ACT OR OTHER EMPLOYEE BENEFIT ACT OF ANY JURISDICTION THAT WOULD OTHERWISE BE APPLICABLE IN THE CASE OF SUCH CLAIM. THIS INDEMNITY OBLIGATION SHALL NOT BE LIMITED BY ANY LIMITATION ON THE AMOUNT OR TYPE OF DAMAGES, COMPENSATION OR BENEFITS PAYABLE BY OR FOR THE CITY OR A CONTRACTOR UNDER WORKERS' COMPENSATION, DISABILITY BENEFIT OR OTHER EMPLOYEE BENEFITS LAWS. THE CITY RECOGNIZES THAT THIS WAIVER WAS SPECIFICALLY ENTERED INTO AND WAS THE SUBJECT OF MUTUAL NEGOTIATION. PROVIDED, HOWEVER, THE CITY'S WAIVER OF IMMUNITY BY THE PROVISIONS OF THIS PARAGRAPH EXTENDS ONLY TO CLAIMS AGAINST THE CITY BY SOUND TRANSIT, AND DOES NOT INCLUDE, OR EXTEND TO, ANY CLAIMS BY THE CITY EMPLOYEE(S) DIRECTLY AGAINST THE CITY.**

7.2 Each Party bears full responsibility for its tax liabilities arising from its responsibilities under this Agreement. Each Party will indemnify the other Party, and hold that other Party harmless from the tax liability of the indemnifying Party, including, but not limited to, penalties, fines, and interest that are assessed by any tax authority against the indemnifying Party, attorney's fees and costs incurred in response to any claims or assessments against the indemnified Party.

7.3 The obligations in this Section shall survive termination or completion of this Agreement as to any claim, loss, or liability arising from events occurring prior to such termination or completion.

**8. Insurance.**

- 8.1 **Coverage.** During the construction phase of any eligible elements (per Section 8) within the project corridor, the City shall provide primary insurance coverage in the amounts that it deems necessary for construction projects of similar size and cost. If the City is self-insured, it shall provide to Sound Transit's risk manager a certificate of self-insurance. The City shall require their contractor(s) and sub-contractors to obtain and maintain insurance in amounts and types suitable to protect Sound Transit and the City from exposures presented by the work performed under this Agreement. The minimum insurance requirements during the entire term of this Agreement are set forth below:
- 8.1.1. Commercial General Liability in the amount of two million dollars (\$2,000,000) each occurrence limit, two million dollars (\$2,000,000) general aggregate limit, covering bodily injury including death, personal injury, property damage, Employers' Liability and contractual coverage endorsements, and utilize insurers and coverage forms acceptable to Sound Transit.
- 8.1.2. Commercial Auto Liability coverage for bodily injury and property damage utilizing insurers and coverage forms acceptable to Sound Transit, with a limit of at least one million dollars (\$1,000,000) combined single limit.
- 8.1.3. Worker's Compensation insurance coverage, where applicable, shall comply with State of Washington Labor and Industries requirements.
- 8.1.4. Builders Risk coverage will be the responsibility of all contractors and subcontractors.
- 8.1.5. Pollution Liability (if there is any potential environmental liability exposure) in the amount of one million dollars (\$1,000,000) each occurrence and two million dollars (\$2,000,000) aggregate.
- 8.1.6. Professional Liability (if there is a potential professional liability exposure) in the amount of one million dollars (\$1,000,000) per claim.
- 8.2 **Certificates.** Certificates of insurance must name Sound Transit as an "Additional Insured," and shall reference the number and title of this Agreement. Certificates of Insurance will be provided to Sound Transit before the start of any work performed under this Agreement. All insurance coverage obtained by the City or its contractors and subcontractors must name Sound Transit, its officers and employees as "additional insured's" and contain "severability of interest" (cross liability) provisions. The City's and the contractor's insurance policies shall be primary to and not contributing with any insurance or self-insurance that may be carried by Sound Transit and waive their right of Subrogation against Sound Transit.
9. **Dispute Resolution.** Any dispute arising from this Agreement shall be resolved as articulated in the Partnering Agreement.
- 9.1. Neither Party will be required to complete the dispute resolution process if a Party may lose or forego a right, remedy, or cause of action that will be time barred before the dispute resolution process will be completed.
10. **Audits.** The Parties will each maintain accounts and records, including contract and financial records that sufficiently and properly reflect all direct and indirect costs of any nature expended for work



performed under this Agreement so as to ensure proper accounting for all monies paid to the City by Sound Transit. These records must be maintained for a period of six (6) years after termination or expiration of this Agreement unless permission to destroy the records is granted by the Office of the Archivist in accordance with chapter 40.14 RCW, and agreed to by the City and Sound Transit.

**11. Duration.** This Agreement shall take effect upon the last date of signature by the Parties as set forth below. This agreement will expire on **December 31, 2025** unless this Agreement is extended by mutual agreement of the Parties in accordance with Section 16.9 below, superseded by a future agreement, or suspended or terminated in accordance with Section 6 above.

**12. Warranties.**

By execution of this Agreement, the City warrants:

12.1.1 That the City has the full right and authority to enter into and perform this Agreement, and that by entering into or performing this Agreement the City is not in violation of any law, regulation, or agreement; and

12.1.2 That the execution, delivery and performance of this Agreement by the City has been duly authorized by all requisite corporate action, that the signatories for the City hereto are authorized to sign this Agreement.

12.2 By execution of this Agreement, Sound Transit warrants:

12.2.1 That Sound Transit has the full right and authority to enter into and perform this Agreement, and that by entering into or performing this Agreement Sound Transit is not in violation of any law, regulation or agreement; and

12.2.2 That the execution, delivery and performance of this Agreement by Sound Transit has been duly authorized by all requisite corporate action, that the signatories for Sound Transit hereto are authorized to sign this Agreement.

**13. Administration of Agreement.**

13.1 This Agreement will be jointly administered by Sound Transit's Designated Representative and the City's Designated Representative.

13.2 Each Party shall be responsible for its own public records and public records requests.

**14. Assignment.** Neither Party may assign all or any portion of this Agreement without the express written consent of the other Party. This Agreement is made and entered into for the sole protection and benefit of the Parties and their successors and assigns. No other person is intended to have a cause of action based upon any provision of this Agreement.

**15. Notices.** All notices required under this Agreement must be in writing and addressed to the Designated Representative. All notices must be either: (i) delivered in person, (ii) deposited postage prepaid in the certified mails of the United States, return receipt requested, (iii) delivered by a nationally recognized overnight or same-day courier service that obtains receipts, or (iv) delivered

electronically to the other Party's Designated Representative. However, notice under Section 10, Termination, must be delivered in person or by certified mail, return receipt requested.

**16. General Provisions.**

16.1 The Parties may not unreasonably withhold requests for information, approvals or consents provided for in this Agreement; provided, however, that approvals or consents required to be given by vote of the Sound Transit Board or the City Council are recognized to be legislative actions. The Parties will take further actions and execute further documents, either jointly or within their respective powers and authority, to implement the intent of this Agreement. The City and Sound Transit will work cooperatively with each other to achieve the mutually agreeable goals as set forth in this Agreement.

16.2 This Agreement shall be interpreted, constructed and enforced in accordance with the laws of the State of Washington. Venue for any action under this Agreement shall be King County, Washington.

16.3 Time is of the essence in every provision of this Agreement. Unless otherwise set forth in this Agreement, the reference to "days" shall mean calendar days unless otherwise noted. Any reference to "working days" shall exclude any legal holidays and weekend days. If any time for action occurs on a weekend or legal holiday, then the time period shall be extended automatically to the next business day.

16.4 No joint venture or partnership is formed as a result of this Agreement. No employees, agents or subcontractors of one Party shall be deemed, or represent themselves to be, employees of any other Party.

16.5 Neither Party is relieved by its obligations to comply promptly with any provision of this Agreement by reason of any failure by the other Party to enforce prompt compliance, and such failure to enforce shall not constitute a waiver of rights or acquiescence in the other Party's conduct.

16.6 This Agreement has been reviewed and revised by legal counsel for both Parties and no presumption or rule that ambiguity shall be construed against the Party drafting the document applies to the interpretation or enforcement of this Agreement. The Parties intend this Agreement to be interpreted to the full extent authorized by applicable law.

16.7 Each Party is responsible for its own costs, including legal fees, incurred in negotiating or finalizing this Agreement, unless otherwise agreed in writing by the Parties. If either Party brings any claim or lawsuit arising from this Agreement, each Party shall pay all its legal costs and attorney's fees and expenses incurred in defending or bringing such claim or lawsuit, including all appeals, in addition to any other recovery or award provided by law; however, nothing in this paragraph shall be construed to limit the Parties' rights to indemnification.

16.8 This Agreement may be executed in several counterparts, each of which shall be deemed an original, and all counterparts together shall constitute but one and the same instrument.

16.9 This Agreement may be amended only by a written instrument executed by both Parties. The Designated Representatives may, by mutual agreement, revise or replace the Exhibits as necessary. Such amendments shall be binding upon the Parties without the need for formal approval by the Sound Transit Board or the City as long as the amendments are generally consistent with this Agreement and do not exceed the funding amount identified in Section 5 or the authority granted by the Sound Transit Board to the Sound Transit CEO. This Agreement may be extended for an additional nine months by mutual agreement of the parties, without additional formal Board or City approval, in order to effectuate the intent of the Agreement.

**17. Severability.** In case any term of this Agreement is held invalid, illegal, or unenforceable in whole or in part, by a court of law, the Parties will reform the Agreement to satisfy the original intent of the Parties.

Each of the Parties has executed this Agreement by having its authorized representative sign below:

CITY OF SHORELINE

SOUND TRANSIT

By: \_\_\_\_\_  
Debbie Tarry, City Manager

By: \_\_\_\_\_  
Peter M. Rogoff, Chief Executive Officer

Date: \_\_\_\_\_

Date: \_\_\_\_\_

Approved as to form:

Approved as to form:

By: \_\_\_\_\_  
Name, Title

By: \_\_\_\_\_  
Name, Title

**Exhibit List:**

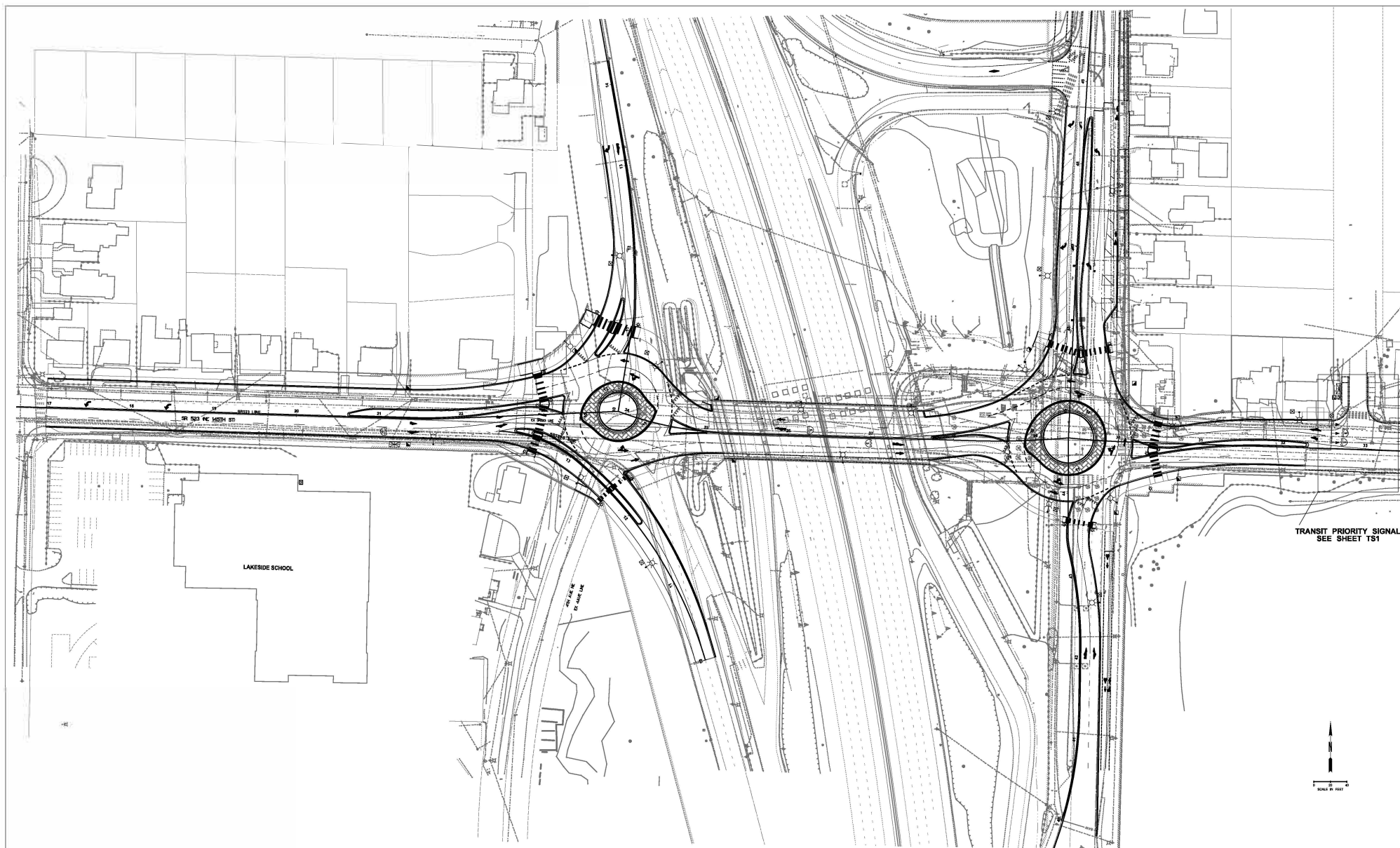
Exhibit A: Vicinity Map showing Interchange Project Improvements and NE 145<sup>th</sup>/SR 522 BRT Improvements

Exhibit B: Invoice Form

**[INSERT EXHIBIT A: PROJECT MAP]**

**Exhibit B: Invoice Form**

Invoice No. \_\_\_\_\_ Dated: \_\_\_\_\_



TRANSIT PRIORITY SIGNAL  
SEE SHEET TS1

LAKESIDE SCHOOL

FILE NAME	c:\pms_working\schonm-d\synd\01440146\UTLTERS ROLL PLOT-updated by Yong.dgn	DATE	2:40:08 PM	TIME	2:40:08 PM
DATE	01/14/2021	DESIGNED BY	Y261	DESIGNED BY	Y261
ENTERED BY		CHECKED BY		PROJ. ENGR.	R. MCCAGHAUGHY
CHECKED BY		DISCIPLINE	TRANSPORTATION	DATE	01/14/2021

FED.AID PROJ. NO. STPLA-6523(011)

**PRELIMINARY**  
**NOT FOR CONSTRUCTION**

LOCHNER

SR 523	MP 0.75 TO MP 1.51	PLAT NO.	
SR 523 (NINE 145TH STREET) & I-5 INTERCHANGE IMPROVEMENTS		DATE	FEBRUARY 2021

**GENERAL NOTES**

1. UTILITY LOCATIONS ARE APPROXIMATE. ALL UNDERGROUND UTILITIES SHALL BE VERIFIED AND LOCATED IN THE FIELD PRIOR TO ANY EXCAVATION.
2. ALL PVC CONDUITS CONTAINING CONDUCTORS SHALL INCLUDE GROUND WIRES. SPARE/EMPTY CONDUITS SHALL CONTAIN BULL LINE TAPE AND SHALL BE LABELED SEATTLE CITY LIGHT.
3. JUNCTION BOXES SHALL NOT BE INSTALLED IN SIDEWALKS OR CURB RAMP.
4. TOP OF ILLUMINATION/SIGNAL POLE FOUNDATIONS SHALL BE FLUSH TO ADJACENT SIDEWALK, TOP SOIL SURFACE, OR CURB AND GUTTER.
5. ALL EXISTING CONDUITS WHICH ARE NO LONGER IN USE SHALL BE CAPPED AND ABANDONED AFTER REMOVAL OF CONDUCTORS AND ELBOWS.

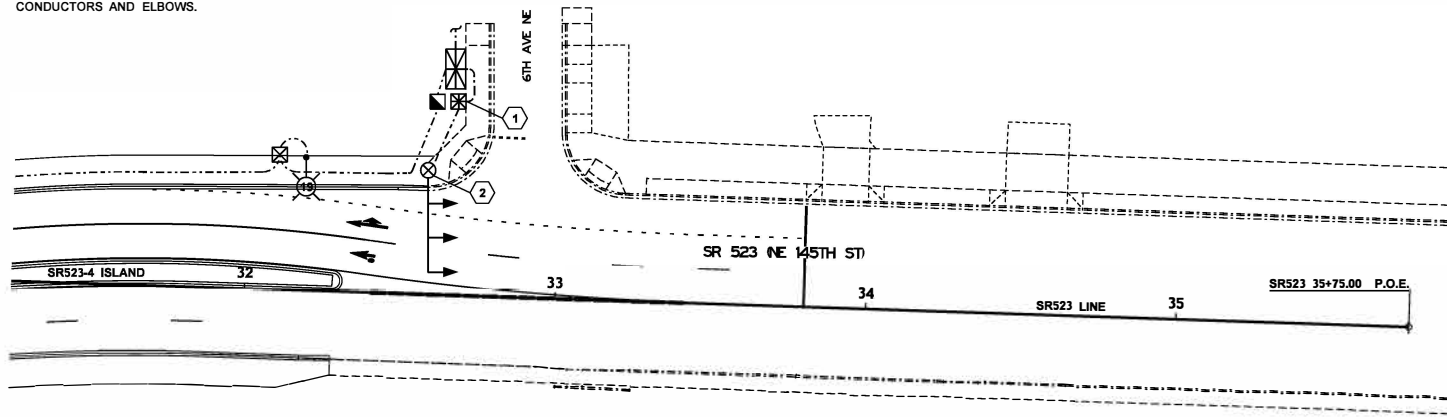


**LEGEND**

- EXISTING POWER POLE
- TYPE 1 JUNCTION BOX
- TYPE 2 JUNCTION BOX
- ELECTRICAL SERVICE CABINET
- NEW BURIED CONDUIT
- EXISTING OVERHEAD POWER
- TYPE 1 LIGHT STANDARD
- CONSTRUCTION NOTE**
- WIRE NOTE
- RAPID-FLASHING BEACON RECTANGULAR TYPE (RRFB)
- TRANSIT PRIORITY SIGNAL

**SIGNAL CONSTRUCTION NOTES**

- 1 CONSTRUCT FOUNDATION AND INSTALL TRAFFIC SIGNAL CONTROL CABINET
- 2 CONSTRUCT FOUNDATION AND INSTALL TRANSIT PRIORITY SIGNAL POLE



FILE NAME: c:\pw_working\lochner-sdc\yhzuid014401416242_PS_Transit Signals.dgn		REGION NO. 10	STATE WASH	FED.AID PROJ.NO. STPUL-0523(011)	<p><b>PRELIMINARY</b></p> <p>NOT FOR CONSTRUCTION</p>	SR 523	MP 0.78 TO MP 1.11	Plot 1	
TIME: 3:34:42 PM	DATE: 9/14/2021	DESIGNED BY: YZHU	ENTERED BY: G WILLHELM	CHECKED BY: N BATEMAN		PLANNING REF. NO. TS1	<p><b>SR 523 (N/NE 145TH STREET) &amp; I-5</b></p> <p><b>INTERCHANGE IMPROVEMENTS</b></p>	<p>KING COUNTY</p> <p>FEBRUARY 2021</p>	<p>SHEET XX OF</p> <p>DIRECTS</p>
PLOTTED BY: YZHU	PROJ. ENGR. R MCGAUGHEY	REGIONAL ADM. M COTTEN	REVISION	DATE		BY			
CONTRACT NO. XXXXXX	LOCATION NO.								

**Exhibit B**

TO: Sound Transit  
Accounts Payable  
401 S Jackson Street  
Seattle, WA 98104

accountspayable@soundtransit.org

Attention: Accounts Payable and [Sound Transit’s Designated Representative]  
Re: Funding Contribution to the right of way and construction phases of the Interchange Project

The City’s authorized representative certifies that the amount of \$\_\_\_\_\_ is due and payable to the City in accordance with the provisions of the Agreement, and is supported by the attached invoice and supporting documentation.

The City makes the following representations and warranties to Sound Transit in connection with the Invoice:

- All work performed to date has been, unless otherwise specifically stated by the City, performed in accordance with the terms and conditions of this Agreement.
- The amount specified above has been computed in accordance with, and is due and payable under, the terms and conditions of the Agreement, has not been the subject of any previous invoice (unless disputed or rejected for payment) and is not the subject of any pending invoice from the City.

Any liability of Sound Transit arising from these representations and warranties are governed by the terms and conditions of the Agreement.

**City of Shoreline**

By: \_\_\_\_\_ Date: \_\_\_\_\_  
[Name, Position]

**CITY COUNCIL AGENDA ITEM**  
CITY OF SHORELINE, WASHINGTON

<b>AGENDA TITLE:</b>	Adoption of Ordinance No. 945 – Amending the 2021-2022 Biennial Budget as Amended, According to the Mid-Biennium Budget Modification
<b>DEPARTMENT:</b>	Administrative Services
<b>PRESENTED BY:</b>	Sara Lane, Administrative Services Director Rick Kirkwood, Budget & Tax Manager
<b>ACTION:</b>	<input checked="" type="checkbox"/> Ordinance <input type="checkbox"/> Resolution <input type="checkbox"/> Motion <input type="checkbox"/> Discussion <input type="checkbox"/> Public Hearing

**PROBLEM/ISSUE STATEMENT:**

State law requires that a mid-biennial budget review be completed during the first year of the biennium between September 1 and December 31. At the November 1, 2021 City Council Regular Meeting, the City Council was presented a brief financial update, recommended adjustments to the 2021-2022 Biennial Budget, and provided information on related policy issues. At the November 8, 2021 City Council Regular Meeting, the City Council conducted a public hearing on the 2021-2022 Biennial Budget and the 2021-2026 Capital Improvement Plan Mid-Biennial Update required by state law (RCW 35A.34.130) prior to the City Council’s adoption of proposed Ordinance No. 945 (Attachment A) providing for the mid-biennial budget modifications as reflected in Attachments B and C, proposed Ordinance No. 946, setting the 2022 regular property tax levy, proposed Ordinance No. 947, setting the 2022 fee schedule for impact fees, and proposed Resolution No. 484, setting the 2022 fee schedule for rates, fees and charges for services.

The public hearings enabled the City Council and City management to hear public comment prior to adoption of the City’s 2021-2022 Budget and 2021-2026 Capital Improvement Plan (CIP) Mid-Biennial Budget Update. This staff report has been issued prior to the public hearings, during which the City Council may have asked for additional information and discussed potential changes to the proposed mid-biennium budget modification, including all proposed levies, taxes, fees, and rates. The questions asked and amendments proposed will be addressed during tonight’s presentation prior to the scheduled adoption of proposed Ordinance No. 945 amending the 2021-2022 Biennial Budget.

**FINANCIAL IMPACT:**

The adopted biennial budget includes revenue and expenditure appropriations for the two years of the biennium for all funds. Since its adoption in November 2020, the City Council has approved two amendments to the budget. The amended biennial budget for all funds totals \$289,902,912.

Adoption of Ordinance No. 945, as presented, provides for the mid-biennial budget amendments, thereby total adjustments result in a net budget increase (appropriation change) of \$26,093,129, comprised of \$17,072,456 of expenditures and \$9,020,673 of transfers out, to a total of \$315,996,041. This proposed amendment also recognizes \$18,182,216 of revenue, \$9,020,673 of transfers in, and uses \$5,097,641 of 2021 unobligated fund balance. It also adopts the 2022 Range Placement Table for non-exempt and exempt staff (Exhibit A), the 2022 Range Placement Table for positions represented by the Public, Professional, and Office-Clerical Employees and Drivers, Local Union No. 763 (Exhibit B), and the 2022 Extra Help Range Placement Table (Exhibit C).

**RECOMMENDATION**

Staff recommends that the City Council adopt Ordinance No. 945, amending the 2021-2022 Biennial Budget according to the mid-biennial budget modification.

Approved By:           City Manager **DT**   City Attorney **MK**



## BACKGROUND

The City Council adopted Ordinance No. 903, adopting the 2021-2022 Biennial Budget on November 16, 2020. The adopted budget includes revenue and expenditure appropriations for the two years of the biennium for all funds. Since that time, the City Council has approved two amendments to the budget. The City's budget is adopted at the fund level which sets the total biennial expenditure authority for each fund and totals \$289,902,912.

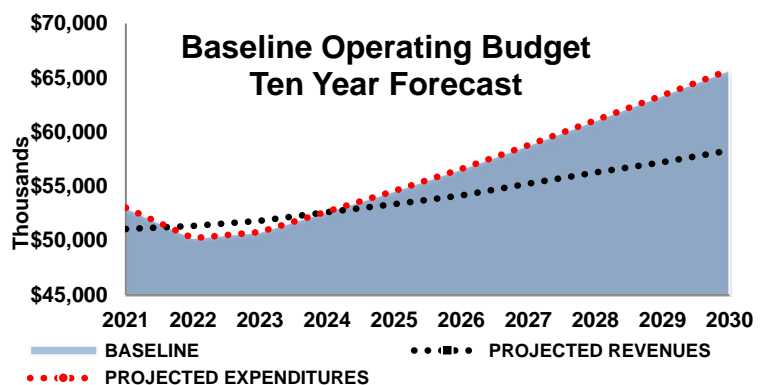
Per RCW 35A.34, the City Council reviews and modifies the adopted biennial budget part way through the first year. The budget is a fiscal plan and changes to it are typical. This mid-biennial budget review provides an opportunity to formally review revenues and appropriations and adjust the budget as needed to address various emerging issues. The amendments proposed through this mid-biennial budget review process include requests to address issues that have emerged or are better understood than when the original budget was approved.

It is important to note the distinction between a budget adjustment and an appropriation change. In simple terms, not all budget adjustments will require a change in appropriation. For example, a budget increase that is funded from an expenditure decrease somewhere else in the budget has the effect of changing the City's spending plan but does not result in any new resources needing appropriation. In contrast, an adjustment that is funded with new internal or external revenues requires an appropriation increase to accommodate the increase in total resources.

A summary of the 2021-2022 biennial budget by fund is included in Attachment D to this staff report. If the mid-biennial budget modification ordinance is approved as proposed, total adjustments result in a net budget increase (appropriation change) of \$26,093,129, comprised of \$17,072,456 of expenditures and \$9,020,673 of transfers out, to a total of \$315,996,041. This proposed amendment also recognizes \$18,182,216 of revenue, \$9,020,673 of transfers in, and uses \$5,097,641 of 2021 unobligated fund balance.

The updated 10 Year Financial Sustainability Model chart reflects the impacts of all ongoing revenues and expenditures, including those proposed in the mid-biennial budget modification, throughout the forecast for the City's operating budget (General and Street Funds). This forecast does not reflect a renewal of the regular property tax levy lid lift for 2023-2028.

Based upon this update, the City's budgets are forecast to be balanced through 2023. This is an improvement from the forecast prepared for the 2021-2022 proposed budget, which forecast shortfalls for the 2021-2022 biennium and beyond.



Proposed Ordinance No. 945 will amend the 2021-2022 biennial budget to provide appropriations for the mid-biennial budget modifications and adopt the 2022 Range Placement Table for non-exempt and exempt staff (Exhibit A), the 2022 Range Placement Table for positions represented by the Public, Professional, and Office-Clerical Employees and Drivers, Local Union No. 763 (Exhibit B), and the 2022 Extra Help Range Placement Table (Exhibit C).

## **DISCUSSION**

### **Proposed Mid-Biennial Budget Modifications – Prior City Council Discussions**

Over the course of the mid-biennium review, the City Council had several discussions, as follows:

- At the November 1, 2021 City Council Regular Meeting, the City Council was presented a brief financial update, recommended adjustments to the 2021-2022 Biennial Budget, and provided information on related policy issues. The link to the staff report for this Council discussion is available here:  
<http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/council/staffreports/2021/staffreport110121-9a.pdf>.

As part of the City Council's fiduciary responsibilities to residents, businesses and other taxpayers, the Mayor and Councilmembers asked questions to which staff provided responses during the presentation on November 8, 2021.

- At the November 8, 2021 City Council Regular Meeting, the City Council conducted public hearings on the 2021-2022 Biennial Budget and the 2021-2026 Capital Improvement Plan Mid-Biennial Update required by state law (RCW 35A.34.130) for the purpose of modifying the City's biennial budget prior to the City Council's adoption of proposed Ordinance No. 945, providing for the mid-biennial budget modifications, proposed Ordinance No. 946, setting the 2022 regular property tax levy, proposed Ordinance No. 947, setting the 2022 fee schedule for impact fees, and proposed Resolution No. 484, setting the 2022 fee schedule for rates, fees and charges for services. The links to the staff reports are available here:  
<http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/council/staffreports/2021/staffreport110821-8a.pdf> and  
<http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/council/staffreports/2021/staffreport110821-8b.pdf>.

The public hearings enabled the City Council and City management to hear public comment prior to adoption of the City's 2021-2022 Budget and 2021-2026 Capital Improvement Plan (CIP) Mid-Biennial Budget Update. This staff report has been issued prior to the public hearings, during which the City Council may have asked for additional information and discussed potential changes to the proposed mid-biennium budget modification, including all proposed levies, taxes, fees, and rates. The questions asked and amendments proposed will be addressed during tonight's presentation prior to the scheduled adoption of proposed Ordinance No. 945 amending the 2021-2022 Biennial Budget.

### **Classification and Compensation Program**

Exhibits A, B and C to proposed Ordinance No. 945 provide the 2022 Range Placement Table for non-exempt and exempt staff, the 2022 Range Placement Table for positions represented by the Public, Professional, and Office-Clerical Employees and Drivers, Local Union No. 763, and the 2022 Extra Help Range Placement Table in accordance with the City's Compensation Plan, respectively. As part of the mid-biennial budget ordinance, the City Council approves the 2022 Range Placement Tables, which include the effect of a 2022 cost of living adjustment, position title changes, and the creation of new position classifications.

### **Proposed Budget Amendments**

As of the writing of this staff report, no potential amendments to the 2021-2022 mid-biennial budget modification have been submitted by Councilmembers. Staff will forward any proposed amendments directly to the City Council if any are proposed prior to tonight's scheduled Council action.

### **FINANCIAL IMPACT**

The adopted biennial budget includes revenue and expenditure appropriations for the two years of the biennium for all funds. Since its adoption in November 2020, the City Council has approved two amendments to the budget. The amended biennial budget for all funds totals \$289,902,912.

Adoption of Ordinance No. 945, as presented, provides for the mid-biennial budget amendments, thereby total adjustments result in a net budget increase (appropriation change) of \$26,093,129, comprised of \$17,072,456 of expenditures and \$9,020,673 of transfers out, to a total of \$315,996,041. This proposed amendment also recognizes \$18,182,216 of revenue, \$9,020,673 of transfers in, and uses \$5,097,641 of 2021 unobligated fund balance. It also adopts the 2022 Range Placement Table for non-exempt and exempt staff (Exhibit A), the 2022 Range Placement Table for positions represented by the Public, Professional, and Office-Clerical Employees and Drivers, Local Union No. 763 (Exhibit B), and the 2022 Extra Help Range Placement Table (Exhibit C).

### **RECOMMENDATION**

Staff recommends that the City Council adopt Ordinance No. 945, amending the 2021-2022 Biennial Budget according to the mid-biennial budget modification.

### **ATTACHMENTS**

Attachment A: Proposed Ordinance No. 945 providing for the mid-biennial budget modifications, including Exhibit A: 2022 Range Placement Table for non-exempt and exempt staff, Exhibit B: 2022 Range Placement Table for positions represented by the Public, Professional, and Office-Clerical Employees and Drivers, Local Union No. 763, and Exhibit C: 2022 Extra Help Range Placement Table

- Attachment B: 2021-2022 Mid-Biennial Budget Modifications (Ord. No. 945) Summary of Impacts on 2021 Plan
- Attachment C: 2021-2022 Mid-Biennial Budget Modifications (Ord. No. 945) Summary of Impacts on 2022 Plan
- Attachment D: Impact of 2021-2022 Mid-Biennial Budget Modifications (Ord. No. 945) on Fund Balance

**ORDINANCE NO. 945**

**AN ORDINANCE OF THE CITY OF SHORELINE, WASHINGTON, ADOPTING THE MODIFICATION OF THE 2021-2022 FINAL BUDGET, AS HAS BEEN PREVIOUSLY AMENDED; ESTABLISHING JOB CLASSIFICATIONS AND PAY RANGES; AND ESTABLISHING AN EFFECTIVE DATE.**

WHEREAS, the 2021-2022 Final Budget was adopted by Ordinance No. 903 and subsequently amended by Ordinance Nos. 922 and 923; and

WHEREAS, pursuant to RCW 35A.34.130, the City conducted a mid-biennial review no sooner than eight months after the start nor later than the conclusion of the first year of the fiscal biennium; and

WHEREAS, the City Council held a properly noticed public hearing on November 8, 2021 on the proposed mid-biennial budget modification; and,

WHEREAS, the City Council has considered the proposed mid-biennial budget modification and has considered any and all comments received from the public, written or oral, with regard to such proposed mid-biennial budget modification; and

WHEREAS, the City of Shoreline is required by RCW 35A.33.075 to include all revenues and expenditures for each fund in the adopted budget and, therefore, the 2021-2022 Final Budget, as amended, needs to be amended to reflect the increases and decreases to the City's funds; and

WHEREAS, the City Council finds that the proposed adjustments to the Biennial Budget for 2021-2022 reflect revenues and expenditures that are intended to ensure the provision of vital municipal services at acceptable levels; and

WHEREAS, the City Council desires to adopt the modification to the 2021-2022 Final Budget;

**NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF SHORELINE, WASHINGTON DO ORDAIN AS FOLLOWS:**

**Section 1. Amendment – 2021-2022 Final Budget.** The City hereby amends the 2021-2022 Final Budget according to the mid-biennium budget modification by increasing appropriations, as follows:

<b>Fund</b>	<b>Current Appropriation</b>	<b>Revised Appropriation</b>
General Fund	\$97,782,109	\$103,157,761
Shoreline Secure Storage Fund	2,259,500	2,259,500
Street Fund	4,159,609	4,272,964
Code Abatement Fund	200,000	200,000
State Drug Enforcement Forfeiture Fund	36,486	36,486
Public Arts Fund	161,505	161,505
Federal Drug Enforcement Forfeiture Fund	26,000	26,000
Transportation Impact Fees Fund	946,805	4,861,071
Park Impact Fees Fund	1,102,561	1,282,809
2006/2016 UTGO Bond Fund	1,135,144	1,135,144
2009/2019 LTGO Bond Fund	2,202,688	2,202,688
2013 LTGO Bond Fund	516,520	516,520
2020 LTGO Bond Fund	25,960,000	25,960,000
Sidewalk LTGO Bond Fund	1,799,100	1,799,100
<b>VLf Revenue Bond Fund</b>	0	<b>552,573</b>
General Capital Fund	17,785,874	21,483,369
City Facility-Major Maintenance Fund	709,226	1,555,925
Roads Capital Fund	56,260,953	58,264,095
Sidewalk Expansion Fund	5,922,995	11,957,995
Surface Water Utility Fund	25,875,682	27,841,192
Wastewater Utility Fund	43,855,290	45,102,630
Vehicle Operations/Maintenance Fund	485,397	594,944
Equipment Replacement Fund	684,468	736,770
Unemployment Fund	35,000	35,000
<b>Total Funds</b>	<b>\$289,902,912</b>	<b>\$315,996,041</b>

**Section 2. Amendment – City of Shoreline Regular FTE Count.** The City of Shoreline hereby amends the 2021-2022 Final Budget to increase the number of full-time equivalent employees (FTE) and the total FTEs for the City, excluding City Council, as follows:

<b>Department</b>	<b>2021 Adopted</b>	<b>2021 Amended</b>	<b>2021 Amended vs. 2021 Adopted</b>	<b>2022 Adopted</b>	<b>2022 Amended</b>	<b>2022 Amended vs. 2022 Adopted</b>
City Manager	22.250	22.250	0.000	22.250	22.250	0.000
Recreation, Cultural & Community Services	<del>27.230</del>	<b>28.970</b>	<b>1.740</b>	<del>27.230</del>	<b>29.130</b>	<b>1.900</b>
City Attorney	3.000	3.000	0.000	3.000	3.000	0.000
Administrative Services	<del>34.925</del>	<b>34.925</b>	<b>0.000</b>	<del>34.925</del>	<b>35.925</b>	<b>1.000</b>
Human Resources	3.000	3.000	0.000	3.000	3.000	0.000
Police	0.000	0.000	0.000	0.000	0.000	0.000
Planning & Community Development	22.820	22.820	0.000	22.820	22.820	0.000

Department	2021 Adopted	2021 Amended	2021 Amended vs. 2021 Adopted	2022 Adopted	2022 Amended	2022 Amended vs. 2022 Adopted
Public Works	<del>39.110</del>	<b>39.110</b>	0.000	<del>39.049</del>	<b>40.949</b>	<b>1.900</b>
Surface Water Utility	<del>17.010</del>	<b>17.010</b>	<b>0.000</b>	<del>17.071</del>	<b>17.696</b>	<b>0.625</b>
Wastewater Utility	<del>14.230</del>	<b>14.230</b>	<b>0.000</b>	<del>14.230</del>	<b>17.705</b>	<b>3.475</b>
Total FTE	<del>183.575</del>	<b>185.315</b>	<b>1.740</b>	<del>183.575</del>	<b>192.475</b>	<b>8.900</b>

All references to total FTEs by department and for the City within the 2021-2022 Biennial Budget shall be amended to reflect this increase.

**Section 3. Amendment – City of Shoreline Range Placement Tables.** The City of Shoreline hereby amends the 2021-2022 Final Budget by making the following amendments:

- A. The 2022 Range Placement Table for non-exempt and exempt staff is replaced with that set forth in Exhibit A attached hereto.
- B. The 2022 Range Placement Table for positions represented by the Public, Professional, and Office-Clerical Employees and Drivers, Local Union No. 763 is set forth in Exhibit B attached hereto.
- C. The 2022 Extra Help Range Placement Table is replaced with that set forth in Exhibit C attached hereto.

**Section 4. Corrections by City Clerk or Code Reviser.** Upon approval of the City Attorney, the City Clerk and/or the Code Reviser are authorized to make necessary corrections to this Ordinance, including the corrections of scrivener or clerical errors; references to other local, state, or federal laws, codes, rules, or regulations; or ordinance numbering and section/subsection numbering and references.

**Section 5. Severability.** Should any section, paragraph, sentence, clause or phrase of this Ordinance, or its application to any person or circumstance, be declared unconstitutional or otherwise invalid for any reason, or should any portion of this ordinance be preempted by state or federal law or regulation, such decision or preemption shall not affect the validity of the remaining portions of this ordinance or its application to other persons or circumstances.

**Section 6. Publication and Effective Date.** A summary of this Ordinance consisting of its title shall be published in the official newspaper of the City.

- A. Sections 1 and 2 of this Ordinance, amending the 2021-2022 Final Budget according to the mid-biennial budget modification by increasing the appropriations and increasing the number of full-time equivalent employees (FTE) and the total FTEs for the City, excluding City Council, shall take effect and be in full force five days after passage and publication.
- B. Section 3 of this Ordinance replacing the 2022 Range Placement Tables and 2022 Extra Help Range Placement Table, shall take effect at 12:01 am January 1, 2022.

**PASSED BY THE CITY COUNCIL ON NOVEMBER 15, 2021.**

\_\_\_\_\_  
Mayor Will Hall

**ATTEST:**

**APPROVED AS TO FORM:**

\_\_\_\_\_  
Jessica Simulcik Smith  
City Clerk

\_\_\_\_\_  
Margaret King  
City Attorney

Date of Publication: , 2021  
Effective Date: , 2021



Attachment A Exhibit A

City of Shoreline  
 Range Placement Table  
 2.5% Between Ranges; 4% Between Steps  
 2022 Min wage: \$14.49

June '20 cpi-U 281.055  
 June '21 cpi-U 296.573  
 Estimated % Change 5.52%  
 100% of % Change: 5.52%

Estimated Mkt Adj: 5.52%  
 Effective: January 1, 2022

The hourly rates represented here have been rounded to 2 decimal points and annual rates to the nearest dollar. Pay is calculated using 5 decimal points for accuracy and rounded after calculation.

Range	Title	FLSA Status	Training Step 0	Min	Step 2	Step 3	Step 4	Step 5	Max
				Step 1					Step 6
1									
2									
3									14.68 30,543
4									15.05 31,307
5								14.83 30,855	15.43 32,089
6							14.62 30,410	15.21 31,627	15.81 32,892
7							14.99 31,171	15.59 32,417	16.21 33,714
8						14.77 30,721	15.36 31,950	15.97 33,228	16.61 34,557
9					14.56 30,278	15.14 31,489	15.74 32,749	16.37 34,059	17.03 35,421
10					14.92 31,035	15.52 32,276	16.14 33,567	16.78 34,910	17.45 36,306

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Range	Title	FLSA Status	Training Step 0	Min					Max
				Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
11				14.71 30,587	15.29 31,811	15.91 33,083	16.54 34,406	17.20 35,783	17.89 37,214
12				15.07 31,352	15.68 32,606	16.30 33,910	16.96 35,267	17.63 36,677	18.34 38,144
13			14.83 30,850	15.45 32,136	16.07 33,421	16.71 34,758	17.38 36,148	18.07 37,594	18.80 39,098
14			15.20 31,621	15.84 32,939	16.47 34,257	17.13 35,627	17.81 37,052	18.53 38,534	19.27 40,075
15			15.58 32,412	16.23 33,763	16.88 35,113	17.56 36,518	18.26 37,978	18.99 39,497	19.75 41,077
16			15.97 33,222	16.64 34,607	17.30 35,991	18.00 37,430	18.72 38,928	19.46 40,485	20.24 42,104
17			16.37 34,053	17.05 35,472	17.74 36,891	18.45 38,366	19.18 39,901	19.95 41,497	20.75 43,157
18			16.78 34,904	17.48 36,359	18.18 37,813	18.91 39,325	19.66 40,898	20.45 42,534	21.27 44,236
19			17.20 35,777	17.92 37,268	18.63 38,758	19.38 40,309	20.15 41,921	20.96 43,598	21.80 45,342
20			17.63 36,671	18.37 38,199	19.10 39,727	19.86 41,316	20.66 42,969	21.48 44,688	22.34 46,475

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Range	Title	FLSA Status	Training Step 0	Min					Max
				Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
21			18.07 37,588	18.82 39,154	19.58 40,720	20.36 42,349	21.17 44,043	22.02 45,805	22.90 47,637
22			18.52 38,528	19.29 40,133	20.07 41,738	20.87 43,408	21.70 45,144	22.57 46,950	23.48 48,828
23			18.99 39,491	19.78 41,136	20.57 42,782	21.39 44,493	22.25 46,273	23.14 48,124	24.06 50,049
24			19.46 40,478	20.27 42,165	21.08 43,851	21.93 45,605	22.80 47,430	23.71 49,327	24.66 51,300
25			19.95 41,490	20.78 43,219	21.61 44,948	22.47 46,746	23.37 48,615	24.31 50,560	25.28 52,582
26			20.45 42,527	21.30 44,299	22.15 46,071	23.04 47,914	23.96 49,831	24.92 51,824	25.91 53,897
27			20.96 43,591	21.83 45,407	22.70 47,223	23.61 49,112	24.56 51,077	25.54 53,120	26.56 55,244
28			21.48 44,680	22.38 46,542	23.27 48,404	24.20 50,340	25.17 52,353	26.18 54,448	27.22 56,626
29			22.02 45,797	22.94 47,706	23.85 49,614	24.81 51,598	25.80 53,662	26.83 55,809	27.90 58,041
30			22.57 46,942	23.51 48,898	24.45 50,854	25.43 52,888	26.44 55,004	27.50 57,204	28.60 59,492

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				Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
31			23.13 48,116	24.10 50,121	25.06 52,126	26.06 54,211	27.11 56,379	28.19 58,634	29.32 60,980
32			23.71 49,319	24.70 51,374	25.69 53,429	26.71 55,566	27.78 57,788	28.89 60,100	30.05 62,504
33			24.30 50,552	25.32 52,658	26.33 54,764	27.38 56,955	28.48 59,233	29.62 61,602	30.80 64,067
34	Administrative Assistant I WW Utility Administrative Assist I WW Utility Customer Service Rep	Non-Exempt, Hourly Non-Exempt, Hourly Non-Exempt, Hourly	24.91 51,816	25.95 53,974	26.99 56,134	28.07 58,379	29.19 60,714	30.36 63,143	31.57 65,668
35			25.53 53,111	26.60 55,324	27.66 57,537	28.77 59,838	29.92 62,232	31.12 64,721	32.36 67,310
36		Non-Exempt, Hourly Non-Exempt, Hourly	26.17 54,439	27.26 56,707	28.35 58,975	29.49 61,334	30.67 63,788	31.89 66,339	33.17 68,993
37	Finance Technician Recreation Specialist I WW Utility Accounting Technician	Non-Exempt, Hourly Non-Exempt, Hourly Non-Exempt, Hourly	26.83 55,800	27.94 58,125	29.06 60,450	30.22 62,868	31.43 65,382	32.69 67,998	34.00 70,718
38	Administrative Assistant II	Non-Exempt, Hourly	27.50 57,195	28.64 59,578	29.79 61,961	30.98 64,439	32.22 67,017	33.51 69,698	34.85 72,486

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				Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
39			28.18 58,625	29.36 61,067	30.53 63,510	31.75 66,050	33.03 68,692	34.35 71,440	35.72 74,298
40	Permit Technician	Non-Exempt, Hourly	28.89	30.09	31.30	32.55	33.85	35.20	36.61
	Public Disclosure Specialist	Non-Exempt, Hourly	60,090	62,594	65,098	67,702	70,410	73,226	76,155
41	Public Art Coordinator	Non-Exempt, Hourly	29.61	30.85	32.08	33.36	34.70	36.08	37.53
	Recreation Specialist II	Non-Exempt, Hourly	61,592	64,159	66,725	69,394	72,170	75,057	78,059
	Senior Finance Technician	Non-Exempt, Hourly							
	Special Events Coordinator	Non-Exempt, Hourly							
42	Administrative Assistant III	Non-Exempt, Hourly	30.35	31.62	32.88	34.20	35.56	36.99	38.47
	Communication Specialist	Non-Exempt, Hourly	63,132	65,763	68,393	71,129	73,974	76,933	80,010
	Human Resources Technician	Non-Exempt, Hourly							
	Legal Assistant	Non-Exempt, Hourly							
	Records Coordinator	Non-Exempt, Hourly							
	Transportation Specialist	Non-Exempt, Hourly							
	Surface Water Program Specialist	Non-Exempt, Hourly							
43	Environmental Program Specialist	Non-Exempt, Hourly	31.11	32.41	33.70	35.05	36.45	37.91	39.43
	Payroll Officer	Non-Exempt, Hourly	64,710	67,407	70,103	72,907	75,823	78,856	82,011
	Purchasing Coordinator	Non-Exempt, Hourly							
44	Engineering Technician	Non-Exempt, Hourly	31.89	33.22	34.55	35.93	37.36	38.86	40.41
			66,328	69,092	71,856	74,730	77,719	80,828	84,061

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Range	Title	FLSA Status	Training Step 0	Min					Max
				Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
45	Assistant Planner	EXEMPT, Annual	32.69	34.05	35.41	36.83	38.30	39.83	41.42
	CRT Representative	Non-Exempt, Hourly	67,986	70,819	73,652	76,598	79,662	82,849	86,163
	PRCS Rental & System Coordinator	Non-Exempt, Hourly							
46	Deputy City Clerk	Non-Exempt, Hourly	33.50	34.90	36.29	37.75	39.26	40.83	42.46
	<b>Engineering Specialist</b>	<b>Non-Exempt, Hourly</b>	69,686	72,590	75,493	78,513	81,654	84,920	88,317
	GIS Technician	Non-Exempt, Hourly							
	IT Specialist	Non-Exempt, Hourly							
	Senior Surface Water Program Specialist	Non-Exempt, Hourly							
Staff Accountant	EXEMPT, Annual								
47	Code Enforcement Officer	Non-Exempt, Hourly	34.34	35.77	37.20	38.69	40.24	41.85	43.52
	Construction Inspector	Non-Exempt, Hourly	71,428	74,405	77,381	80,476	83,695	87,043	90,524
	Executive Assistant to City Manager	EXEMPT, Annual							
	Plans Examiner I	Non-Exempt, Hourly							
48			35.20	36.67	38.13	39.66	41.24	42.89	44.61
			73,214	76,265	79,315	82,488	85,787	89,219	92,788
49	Associate Planner	EXEMPT, Annual	36.08	37.58	39.09	40.65	42.28	43.97	45.72
	Grounds Maintenance Supervisor	EXEMPT, Annual	75,044	78,171	81,298	84,550	87,932	91,449	95,107
	IT Functional Analyst	EXEMPT, Annual							
	PRCS Supervisor I - Recreation	EXEMPT, Annual							
	<b>GIS Analyst</b>	<b>EXEMPT, Annual</b>							

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				Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
50	Combination Inspector	Non-Exempt, Hourly	36.98	38.52	40.06	41.67	43.33	45.07	46.87
	Diversity and Inclusion Coordinator	EXEMPT, Annual	76,921	80,126	83,331	86,664	90,130	93,736	97,485
	Housing & Human Services Coordinator	Non-Exempt, Hourly							
	Limited Term Light Rail Project Coordinator	EXEMPT, Annual							
	Neighborhoods Coordinator	EXEMPT, Annual							
	Utility Operations Specialist	Non-Exempt, Hourly							
	WW Utility Specialist	Non-Exempt, Hourly							
	<b>Limited Term Communtiy Support Specialist</b>	<b>EXEMPT, Annual</b>							
51	B&O Tax Analyst	EXEMPT, Annual	37.91	39.48	41.06	42.71	44.42	46.19	48.04
	Budget Analyst	EXEMPT, Annual	78,844	82,129	85,414	88,830	92,384	96,079	99,922
	Emergency Management Coordinator	EXEMPT, Annual							
	<b>Environmental Services Coordinator</b>	<b>EXEMPT, Annual</b>							
	Management Analyst	EXEMPT, Annual							
	Plans Examiner II	Non-Exempt, Hourly							
	Senior Accounting Analyst	EXEMPT, Annual							
52			38.85	40.47	42.09	43.77	45.53	47.35	49.24
			80,815	84,182	87,549	91,051	94,693	98,481	102,420
53	Communications Program Manager	EXEMPT, Annual	39.82	41.48	43.14	44.87	46.66	48.53	50.47
	PRCS Supervisor II - Recreation	EXEMPT, Annual	82,835	86,286	89,738	93,327	97,060	100,943	104,981
	Senior Human Resources Analyst	EXEMPT, Annual							
	Web Systems Analyst	EXEMPT, Annual							
	<b>Environmental Services Program Manager</b>	<b>EXEMPT, Annual</b>							
54	Code Enforcement and CRT Supervisor	EXEMPT, Annual	40.82	42.52	44.22	45.99	47.83	49.74	51.73
	PW Maintenance Superintendent	EXEMPT, Annual	84,906	88,444	91,981	95,661	99,487	103,467	107,605
	Senior Planner	EXEMPT, Annual							

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Range	Title	FLSA Status	Training Step 0	Min					Max
				Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
55	CMO Management Analyst	EXEMPT, Annual	41.84	43.58	45.33	47.14	49.03	50.99	53.03
	Engineer I - Capital Projects	EXEMPT, Annual	87,029	90,655	94,281	98,052	101,974	106,053	110,295
	Engineer I - Development Review	EXEMPT, Annual							
	Engineer I - Surface Water	EXEMPT, Annual							
	Engineer I - Traffic	EXEMPT, Annual							
	Grants Administrator	EXEMPT, Annual							
	Plans Examiner III	Non-Exempt, Hourly							
	Senior Management Analyst	EXEMPT, Annual							
56	Parks Superintendent	EXEMPT, Annual	42.89	44.67	46.46	48.32	50.25	52.26	54.35
			89,204	92,921	96,638	100,503	104,524	108,705	113,053
57			43.96	45.79	47.62	49.53	51.51	53.57	55.71
			91,434	95,244	99,054	103,016	107,137	111,422	115,879
58	City Clerk	EXEMPT, Annual	45.06	46.94	48.81	50.77	52.80	54.91	57.10
	IT Projects Manager	EXEMPT, Annual	93,720	97,625	101,530	105,591	109,815	114,208	118,776
	Network Administrator	EXEMPT, Annual							
59	Budget and Tax Manager	EXEMPT, Annual	46.18	48.11	50.03	52.03	54.12	56.28	58.53
	Engineer II - Capital Projects	EXEMPT, Annual	96,063	100,066	104,068	108,231	112,560	117,063	121,745
	Engineer II - Development Review	EXEMPT, Annual							
	Engineer II - Surface Water	EXEMPT, Annual							
	Engineer II - Traffic	EXEMPT, Annual							
	<b>Engineer II - Wastewater</b>	<b>EXEMPT, Annual</b>							
	Lynnwood Link Extension Light Rail Project Manager	EXEMPT, Annual							
	Structural Plans Examiner	EXEMPT, Annual							
Wastewater Manager	EXEMPT, Annual								



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Range	Title	FLSA Status	Training Step 0	Min					Max
				Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
60	Community Services Manager	EXEMPT, Annual	47.34	49.31	51.28	53.34	55.47	57.69	59.99
	IT Systems Analyst	EXEMPT, Annual	98,465	102,567	106,670	110,937	115,374	119,989	124,789
	Recreation Superintendent	EXEMPT, Annual							
	Permit Services Manager	EXEMPT, Annual							
61			48.52	50.54	52.57	54.67	56.86	59.13	61.49
			100,926	105,132	109,337	113,710	118,259	122,989	127,909
62	Engineer III - Lead Project Manager	EXEMPT, Annual	49.74	51.81	53.88	56.04	58.28	60.61	63.03
	<b>Fleet and Facilities Manager</b>	<b>EXEMPT, Annual</b>	103,450	107,760	112,070	116,553	121,215	126,064	131,106
63	Building Official	EXEMPT, Annual	50.98	53.10	55.23	57.44	59.73	62.12	64.61
	<b>City Traffic Engineer</b>	<b>EXEMPT, Annual</b>	106,036	110,454	114,872	119,467	124,246	129,216	134,384
	Economic Development Program Manager	EXEMPT, Annual							
	Intergovernmental / CMO Program Manager	EXEMPT, Annual							
	Planning Manager	EXEMPT, Annual							
SW Utility Manager	EXEMPT, Annual								
64	Finance Manager	EXEMPT, Annual	52.25	54.43	56.61	58.87	61.23	63.68	66.22
			108,687	113,215	117,744	122,454	127,352	132,446	137,744
65	Assistant City Attorney	EXEMPT, Annual	53.56	55.79	58.02	60.34	62.76	65.27	67.88
	Development Review and Construction Manager	EXEMPT, Annual	111,404	116,046	120,688	125,515	130,536	135,757	141,187
	Engineering Manager	EXEMPT, Annual							
	Transportation Services Manager	EXEMPT, Annual							
<b>City Traffic Engineer</b>	<b>EXEMPT, Annual</b>								
66			54.90	57.19	59.47	61.85	64.33	66.90	69.58
			114,189	118,947	123,705	128,653	133,799	139,151	144,717
67	Information Technology Manager	EXEMPT, Annual	56.27	58.62	60.96	63.40	65.93	68.57	71.31
	Utility & Operations Manager	EXEMPT, Annual	117,044	121,921	126,797	131,869	137,144	142,630	148,335
	<b>Parks, Fleet and Facilities Manager</b>	<b>EXEMPT, Annual</b>							

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				Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
68			57.68 119,970	60.08 124,969	62.48 129,967	64.98 135,166	67.58 140,573	70.29 146,196	73.10 152,043
69	City Engineer	EXEMPT, Annual	59.12 122,969	61.58 128,093	64.05 133,216	66.61 138,545	69.27 144,087	72.04 149,850	74.93 155,844
70			60.60 126,043	63.12 131,295	65.65 136,547	68.27 142,009	71.00 147,689	73.84 153,597	76.80 159,741
71			62.11 129,194	64.70 134,577	67.29 139,961	69.98 145,559	72.78 151,381	75.69 157,437	78.72 163,734
72			63.67 132,424	66.32 137,942	68.97 143,460	71.73 149,198	74.60 155,166	77.58 161,373	80.69 167,827
73	Human Resource and Org. Development Director	EXEMPT, Annual	65.26 135,735	67.98 141,390	70.70 147,046	73.52 152,928	76.46 159,045	79.52 165,407	82.70 172,023
74				69.68 144,925	72.46 150,722	75.36 156,751	78.38 163,021	81.51 169,542	84.77 176,324
75	Administrative Services Director Planning & Community Development Director <b>Parks, Rec &amp; Cultural Svcs Director</b> <b>Recreation, Cultural &amp; Community Services Director</b>	EXEMPT, Annual EXEMPT, Annual <b>EXEMPT, Annual</b> <b>EXEMPT, Annual</b>	68.56 142,606	71.42 148,548	74.27 154,490	77.25 160,670	80.33 167,097	83.55 173,781	86.89 180,732
76	City Attorney Public Works Director	EXEMPT, Annual EXEMPT, Annual	70.27 146,172	73.20 152,262	76.13 158,353	79.18 164,687	82.34 171,274	85.64 178,125	89.06 185,250
77	Assistant City Manager	EXEMPT, Annual EXEMPT, Annual	72.03 149,826	75.03 156,069	78.03 162,311	81.16 168,804	84.40 175,556	87.78 182,578	91.29 189,881

Attachment A Exhibit B

City of Shoreline  
 Range Placement Table  
 2.5% Between Ranges; 4% Between Steps  
 2022 Min wage: \$14.49

June '20 cpi-U 281.055 CPI-U % Chg.  
 June '21 cpi-U 296.573 5.52%  
 CPI-U 1%min - 4%max: 4.00%  
 2022: 4.00%

Adjustment: 4.00%  
 Effective: January 1, 2022

The hourly rates represented here have been rounded to 2 decimal points and annual rates to the nearest dollar. Pay is calculated using 5 decimal points for accuracy and rounded after calculation.

Range	Title	FLSA Status	Min					Max
			Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
1								
2								
3								
4								14.83
5								15.21
6							14.99	15.59
7							15.36	15.98
8						15.14	15.74	16.37
9					14.92	15.52	16.14	16.78
10					15.29	15.91	16.54	17.20
11				15.07	15.68	16.30	16.96	17.63
12			14.86	15.45	16.07	16.71	17.38	18.07
13			15.23	15.84	16.47	17.13	17.81	18.53
14			15.61	16.23	16.88	17.56	18.26	18.99
15			16.00	16.64	17.30	18.00	18.72	19.46

Attachment A Exhibit B

City of Shoreline  
 Range Placement Table  
 2.5% Between Ranges; 4% Between Steps  
 2022 Min wage: \$14.49

June '20 cpi-U 281.055 CPI-U % Chg.  
 June '21 cpi-U 296.573 5.52%  
 CPI-U 1%min - 4%max: 4.00%  
 2022: 4.00%

Adjustment: 4.00%  
 Effective: January 1, 2022

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Range	Title	FLSA Status	Min					Max
			Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
16			16.40	17.05	17.74	18.45	19.18	19.95
17			16.81	17.48	18.18	18.91	19.66	20.45
18			17.23	17.92	18.63	19.38	20.15	20.96
19			17.66	18.37	19.10	19.86	20.66	21.48
20			18.10	18.82	19.58	20.36	21.17	22.02
21			18.55	19.30	20.07	20.87	21.70	22.57
22			19.02	19.78	20.57	21.39	22.25	23.14
23			19.49	20.27	21.08	21.93	22.80	23.72
24			19.98	20.78	21.61	22.47	23.37	24.31
25			20.48	21.30	22.15	23.04	23.96	24.92
26			20.99	21.83	22.70	23.61	24.56	25.54
27			21.52	22.38	23.27	24.20	25.17	26.18
28			22.05	22.94	23.85	24.81	25.80	26.83
29			22.61	23.51	24.45	25.43	26.44	27.50
30			23.17	24.10	25.06	26.06	27.11	28.19

Attachment A Exhibit B

**City of Shoreline**  
**Range Placement Table**  
**2.5% Between Ranges; 4% Between Steps**  
 2022 Min wage: \$14.49

June '20 cpi-U 281.055 CPI-U % Chg.  
 June '21 cpi-U 296.573 **5.52%**  
 CPI-U 1%min - 4%max: 4.00%  
 2022: 4.00%

**Adjustment: 4.00%**  
 Effective: January 1, 2022

The hourly rates represented here have been rounded to 2 decimal points and annual rates to the nearest dollar. Pay is calculated using 5 decimal points for accuracy and rounded after calculation.

Range	Title	FLSA Status	Min					Max
			Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
31			23.75	24.70	25.69	26.71	27.78	28.89
32			24.34	25.32	26.33	27.38	28.48	29.62
33			24.95	25.95	26.99	28.07	29.19	30.36
34			25.58	26.60	27.66	28.77	29.92	31.12
35			26.21	27.26	28.35	29.49	30.67	31.89
36	Grounds Maintenance Worker I PW Maintenance Worker I	Non-Exempt, Hourly Non-Exempt, Hourly	26.87	27.95	29.06	30.23	31.43	32.69
37	WW Utility Maintenance Worker I	Non-Exempt, Hourly	27.54	28.64	29.79	30.98	32.22	33.51
38	Facilities Maintenance Worker I	Non-Exempt, Hourly	28.23	29.36	30.53	31.76	33.03	34.35
39			28.94	30.09	31.30	32.55	33.85	35.21
40	Grounds Maintenance Worker II Parks Maintenance Worker II PW Maintenance Worker II	Non-Exempt, Hourly Non-Exempt, Hourly Non-Exempt, Hourly	29.66	30.85	32.08	33.36	34.70	36.09
41	WW Utility Maintenance Worker II	Non-Exempt, Hourly	30.40	31.62	32.88	34.20	35.57	36.99
42	Facilities Maintenance Worker II	Non-Exempt, Hourly	31.16	32.41	33.70	35.05	36.45	37.91
43			31.94	33.22	34.55	35.93	37.37	38.86
44			32.74	34.05	35.41	36.83	38.30	39.83
45			33.56	34.90	36.30	37.75	39.26	40.83

Attachment A Exhibit B

**City of Shoreline**  
**Range Placement Table**  
**2.5% Between Ranges; 4% Between Steps**  
 2022 Min wage: \$14.49

June '20 cpi-U 281.055 CPI-U % Chg.  
 June '21 cpi-U 296.573 **5.52%**  
 CPI-U 1%min - 4%max: 4.00%  
 2022: 4.00%

**Adjustment: 4.00%**  
 Effective: January 1, 2022

The hourly rates represented here have been rounded to 2 decimal points and annual rates to the nearest dollar. Pay is calculated using 5 decimal points for accuracy and rounded after calculation.

Range	Title	FLSA Status	Min					Max
			Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
46	Senior Grounds Maintenance Worker Senior Facilities Maintenance Worker Senior Parks Maintenance Worker-General Maintenance Senior PW Maintenance Worker	Non-Exempt, Hourly Non-Exempt, Hourly Non-Exempt, Hourly Non-Exempt, Hourly	34.40	35.77	37.20	38.69	40.24	41.85
47	Senior WW Utility Maintenance Worker	Non-Exempt, Hourly	35.26	36.67	38.13	39.66	41.24	42.89
48	Senior Parks Maintenance Worker-Urban Forestry	Non-Exempt, Hourly	36.14	37.58	39.09	40.65	42.28	43.97
49			37.04	38.52	40.06	41.67	43.33	45.07
50			37.97	39.49	41.07	42.71	44.42	46.19
51			38.92	40.47	42.09	43.78	45.53	47.35
52			39.89	41.48	43.14	44.87	46.66	48.53
53			40.89	42.52	44.22	45.99	47.83	49.74
54			41.91	43.58	45.33	47.14	49.03	50.99
55			42.96	44.67	46.46	48.32	50.25	52.26
56			44.03	45.79	47.62	49.53	51.51	53.57
57			45.13	46.94	48.81	50.77	52.80	54.91
58			46.26	48.11	50.03	52.04	54.12	56.28
59			47.42	49.31	51.28	53.34	55.47	57.69

Attachment A Exhibit B

City of Shoreline  
 Range Placement Table  
 2.5% Between Ranges; 4% Between Steps  
 2022 Min wage: \$14.49

June '20 cpi-U 281.055 CPI-U % Chg.  
 June '21 cpi-U 296.573 5.52%  
 CPI-U 1%min - 4%max: 4.00%  
 2022: 4.00%

Adjustment: 4.00%  
 Effective: January 1, 2022

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Range	Title	FLSA Status	Min					Max
			Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
60			48.60	50.54	52.57	54.67	56.86	59.13
61			49.82	51.81	53.88	56.04	58.28	60.61
62			51.06	53.10	55.23	57.44	59.73	62.12
63			52.34	54.43	56.61	58.87	61.23	63.68
64			53.65	55.79	58.02	60.34	62.76	65.27
65			54.99	57.19	59.47	61.85	64.33	66.90
66			56.36	58.62	60.96	63.40	65.94	68.57
67			57.77	60.08	62.49	64.98	67.58	70.29
68			59.22	61.58	64.05	66.61	69.27	72.04
69			60.70	63.12	65.65	68.27	71.01	73.85
70			62.21	64.70	67.29	69.98	72.78	75.69
71			63.77	66.32	68.97	71.73	74.60	77.58
72			65.36	67.98	70.70	73.52	76.47	79.52
73			67.00	69.68	72.46	75.36	78.38	81.51
74			68.67	71.42	74.28	77.25	80.34	83.55

Attachment A Exhibit B

City of Shoreline  
 Range Placement Table  
 2.5% Between Ranges; 4% Between Steps

June '20 cpi-U 281.055 CPI-U % Chg.  
 June '21 cpi-U 296.573 5.52%  
 CPI-U 1%min - 4%max: 4.00%  
 2022: 4.00%

Adjustment: 4.00%  
 Effective: January 1, 2022

2022 Min wage: \$14.49

The hourly rates represented here have been rounded to 2 decimal points and annual rates to the nearest dollar. Pay is calculated using 5 decimal points for accuracy and rounded after calculation.

Range	Title	FLSA Status		Min					Max
				Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
75				70.39	73.20	76.13	79.18	82.34	85.64
76				72.15	75.03	78.04	81.16	84.40	87.78
77				73.95	76.91	79.99	83.19	86.51	89.97



**City of Shoreline**  
**Extra Help Range Placement Table**  
**2022 Min wage: \$14.49**

Estimated COLA: 5.52%  
 Effective: January 1, 2022

Range	Title	FLSA Status	Pay Band	
			Minimum	Maximum
1	Day Camp Leader Special Events Attendant Youth Outreach Leader	Non-Exempt, Hourly Non-Exempt, Hourly Non-Exempt, Hourly	\$14.55	\$15.72
2	Building Monitor Indoor Playground Attendant Sr. Day Camp Leader	Non-Exempt, Hourly Non-Exempt, Hourly Non-Exempt, Hourly	\$14.80	\$16.05
3	Special Events Assistant Special Events Monitor Teen Program Leader Assistant	Non-Exempt, Hourly Non-Exempt, Hourly Non-Exempt, Hourly	\$15.05	\$16.39
4	Records Clerk	Non-Exempt, Hourly	\$15.31	\$16.75
5	Undergraduate Intern	Non-Exempt, Hourly Non-Exempt, Hourly	\$15.56	\$17.10
6			\$15.84	\$17.46
7			\$16.10	\$17.84
8			\$16.37	\$18.21
9	CIT Camp Director Specialized Recreation Specialist	Non-Exempt, Hourly Non-Exempt, Hourly	\$16.66	\$18.60
10	Teen Program Leader		\$16.94	\$18.99
11	Out of School Time Program Director Assistant Camp Director	Non-Exempt, Hourly Non-Exempt, Hourly	\$17.22	\$19.39
12			\$17.51	\$19.80
13	Front Desk Attendant		\$17.82	\$20.23
14	Camp Excel Specialist Camp Director	Non-Exempt, Hourly Non-Exempt, Hourly	\$18.13	\$20.65
15			\$20.05	\$23.40
16			\$16.66	\$18.60

**City of Shoreline**  
**Extra Help Range Placement Table**  
**2022 Min wage: \$14.49**

Estimated COLA: 5.52%  
 Effective: January 1, 2022

Range	Title	FLSA Status	Pay Band	
			Minimum	Maximum
17			\$19.07	\$21.98
18			\$19.38	\$22.44
19			\$19.71	\$22.92
20			\$20.05	\$23.40
21	Engineering Support	Non-Exempt, Hourly Non-Exempt, Hourly	\$20.39	\$23.89
22			\$20.73	\$24.39
23			\$21.08	\$24.89
24			\$21.43	\$25.42
25			\$21.80	\$25.95
26			\$22.17	\$26.51
27			\$22.55	\$27.06
28	Finance Assistant Permitting Assistant	Non-Exempt, Hourly	\$22.93	\$27.63
29			\$23.32	\$28.19
30	Grounds Maintenance Laborer Parks Maintenance Seasonal Laborer		\$23.71	\$28.79
31	Computer Support GIS Support	Non-Exempt, Hourly Non-Exempt, Hourly	\$24.10	\$29.31
32	PW Seasonal Laborer	Non-Exempt, Hourly	\$24.69	\$30.05
33		Non-Exempt, Hourly	\$25.32	\$30.79
34		Non-Exempt, Hourly	\$25.94	\$31.57
35	CMO Fellowship	Non-Exempt, Hourly	\$26.60	\$32.35
36	Facilities Maintenance	Non-Exempt, Hourly	\$27.26	\$33.16
37			\$27.95	\$34.01

**City of Shoreline**  
**Extra Help Range Placement Table**  
**2022 Min wage: \$14.49**

Estimated COLA: 5.52%  
 Effective: January 1, 2022

Range	Title	FLSA Status	Pay Band	
			Minimum	Maximum
38			\$28.64	\$34.84
39			\$29.36	\$35.72
40			\$30.09	\$36.60
41			\$30.83	\$37.53
42			\$31.61	\$38.46
43			\$32.41	\$39.43
44			\$33.21	\$40.41
45			\$34.05	\$41.43
46	Videographer	Non-Exempt, Hourly	\$34.91	\$42.46
	Expert Professional	Non-Exempt, Hourly	\$14.55	\$42.46
	Inspector	Non-Exempt, Hourly		
	Instructor	Non-Exempt, Hourly		

**Table Maintenance:** The 2020 Extra Help table has been structured to blend in substantial change in WA State minimum wage occurring in 2020. In 2020, the minimum wage will be \$13.50. In 2020, apply a COLA to the extra help rates on the same basis as the regular rates. Then, in 2020, if any rates fall below \$13.50 adjust them to \$13.50. From then on, apply a COLA as usual and if any rates fall below WA State Minimum Wage, adjust them to the WA State Minimum Wage.

**Approval of Position Placement within the Table:** Human Resources recommends and the City Manager approves placement of a position within the pay table.

**Approval of the Table Rates:** The City Manager recommends and the City Council approves the table rates when adopting the budget.

## 2021-2022 Mid-Biennial Budget Modifications (Ord. No. 945) Summary of Impacts on 2021 Plan (Attachment B)

CATEGORY						
Fund	FTE					Use of Fund
Department/Program	Change	Revenues	Transfers In	Expenditures	Transfers Out	Balance
<b>EMERGING ISSUES IMPACTING MULTIPLE FUNDS</b>			\$559,078	\$24,300	\$559,078	\$4,300
<b>King County Treatment Fee Increase for Wastewater Utility</b>			\$6,505			\$0
Vehicle O&M Fund			\$6,505			\$0
<b>Grounds Maintenance Small Tools and Equipment</b>				\$4,300		\$4,300
Surface Water Utility Fund				\$4,300		\$4,300
<b>General Fund Contribution for KC Radio Communications Services/APX 4500 Radios</b>					\$6,505	\$0
General Fund					\$6,505	\$0
<b>VLF Bond Debt Service</b>			\$552,573	\$20,000	\$552,573	\$0
TBD Fund					\$552,573	\$0
VLF Revenue Bond Fund			\$552,573	\$20,000		\$0
<b>PERSONNEL</b>	<b>0.340</b>			\$54,776		\$54,776
<b>Temporary FTE Increase for Youth and Teen Development Program Pilot Program</b>	<b>0.340</b>			\$54,776		\$54,776
General Fund	0.340			\$54,776		\$54,776
<b>EMERGING ISSUES IMPACTING THE WASTEWATER UTILITY FUND</b>				\$300,000		\$300,000
<b>Ronald Wastewater District Transition Cost Reimbursement</b>				\$300,000		\$300,000
Wastewater Utility Fund				\$300,000		\$300,000
<b>MID-BIENNIAL BUDGET "TRUE-UPS" IMPACTING MULTIPLE FUNDS</b>		(\$749,218)	\$272,272	(\$650,214)	\$272,272	(\$264,524)
<b>Durable Pavement Marking (Thermoplastic) Maintenance</b>			(\$25,931)	(\$54,325)	(\$25,931)	\$0
Equipment Replacement Fund			(\$25,931)	(\$54,325)		\$0
General Fund					(\$25,931)	\$0
<b>Street Sweeper Acquisition</b>		(\$102,676)	\$237,026	\$14,441	\$237,026	\$326,467
Equipment Replacement Fund		(\$102,676)		(\$312,026)	\$237,026	\$237,026
Surface Water Utility Fund			\$237,026	\$326,467		\$89,441

## 2021-2022 Mid-Biennial Budget Modifications (Ord. No. 945) Summary of Impacts on 2021 Plan (Attachment B)

CATEGORY						
Fund	FTE					Use of Fund
Department/Program	Change	Revenues	Transfers In	Expenditures	Transfers Out	Balance
<b>Street Sweeper Repairs</b>		<b>\$36,212</b>		<b>\$72,424</b>		<b>\$36,212</b>
Surface Water Utility Fund				\$36,212		\$36,212
Vehicle O&M Fund		\$36,212		\$36,212		\$0
<b>Surface Water Equipment Replacement Charges</b>		<b>(\$24,619)</b>	<b>\$61,177</b>	<b>(\$24,619)</b>	<b>\$61,177</b>	<b>\$61,177</b>
Equipment Replacement Fund		(\$24,619)			\$61,177	\$61,177
Surface Water Utility Fund			\$61,177	(\$24,619)		\$0
<b>Wastewater Equipment Replacement and Vehicle Operations/Maintenance (O&amp;M Charges)</b>		<b>(\$658,135)</b>		<b>(\$658,135)</b>		<b>(\$688,380)</b>
Equipment Replacement Fund		(\$688,380)				\$0
Vehicle O&M Fund		\$30,245		\$30,245		\$0
Wastewater Utility Fund				(\$688,380)		(\$688,380)
<b>MID-BIENNIAL BUDGET "TRUE-UPS" IMPACTING THE GENERAL FUND</b>	<b>0.000</b>	<b>\$3,039,674</b>			<b>\$34,359</b>	<b>\$0</b>
<b>Property Management Lease Revenue</b>		<b>(\$25,100)</b>				<b>\$0</b>
General Fund		(\$25,100)				\$0
<b>General Fund Revenues</b>	<b>0.000</b>	<b>\$3,064,774</b>			<b>\$34,359</b>	<b>\$0</b>
General Fund	0.000	\$3,064,774			\$34,359	\$0
<b>AMERICAN RESCUE PLAN ACT (ARPA)</b>	<b>1.400</b>	<b>\$3,808,524</b>		<b>\$891,024</b>		<b>\$4,500</b>
<b>ARPA: 1.40 FTE Limited-Term ARPA Navigators</b>	<b>1.400</b>	<b>\$58,524</b>		<b>\$58,524</b>		<b>\$0</b>
General Fund	1.400	\$58,524		\$58,524		\$0
<b>ARPA: Outreach and Analysis to Shoreline Businesses Through a Partnership with the Shoreline Chamber of Commerce</b>		<b>\$28,000</b>		<b>\$28,000</b>		<b>\$0</b>
General Fund		\$28,000		\$28,000		\$0
<b>ARPA: Qualifying Infrastructure Investments - Pump Station 26 Improvements Project</b>		<b>\$2,922,000</b>				<b>\$0</b>
Surface Water Utility Fund		\$2,922,000				\$0
<b>ARPA: Qualifying Infrastructure Investments - Wastewater 14th Interchange Coordination</b>		<b>\$400,000</b>		<b>\$402,000</b>		<b>\$2,000</b>
Wastewater Utility Fund		\$400,000		\$402,000		\$2,000

## 2021-2022 Mid-Biennial Budget Modifications (Ord. No. 945) Summary of Impacts on 2021 Plan (Attachment B)

CATEGORY						
Fund	FTE					Use of Fund
Department/Program	Change	Revenues	Transfers In	Expenditures	Transfers Out	Balance
<b>ARPA: 1st Ave Wastewater Pipe Replacement</b>		<b>\$400,000</b>		<b>\$402,500</b>		<b>\$2,500</b>
Wastewater Utility Fund		\$400,000		\$402,500		\$2,500
<b>OTHER GRANTS</b>		<b>\$771,301</b>		<b>\$771,301</b>		<b>\$0</b>
<b>Community Development Block Grant - COVID</b>		<b>\$634,723</b>		<b>\$634,723</b>		<b>\$0</b>
General Fund		\$634,723		\$634,723		\$0
<b>Local Solid Waste Financial Assistance Grant</b>		<b>\$79,598</b>		<b>\$79,598</b>		<b>\$0</b>
General Fund		\$79,598		\$79,598		\$0
<b>Port of Seattle Economic Development Partnership Program Grant</b>		<b>\$56,980</b>		<b>\$56,980</b>		<b>\$0</b>
General Fund		\$56,980		\$56,980		\$0
<b>MID-BIENNIAL BUDGET "TRUE-UPS" IMPACTING THE STREET FUND</b>	<b>0.000</b>	<b>(\$34,359)</b>	<b>\$34,359</b>			<b>\$0</b>
<b>Street Fund Revenues</b>	<b>0.000</b>	<b>(\$34,359)</b>	<b>\$34,359</b>			<b>\$0</b>
Street Fund	0.000	(\$34,359)	\$34,359			\$0
<b>2021-2022 CIP: GENERAL CAPITAL FUND</b>		<b>\$757,540</b>	<b>\$2,610,865</b>	<b>\$3,416,990</b>	<b>\$2,610,865</b>	<b>\$2,650,220</b>
<b>Parks Restrooms Renovation</b>		<b>\$403,760</b>	<b>\$38,240</b>	<b>\$442,000</b>	<b>\$38,240</b>	<b>\$38,240</b>
General Capital Fund		\$403,760	\$38,240	\$442,000		\$0
General Fund					\$38,240	\$38,240
<b>Shoreline Park Public Pavilion</b>		<b>\$353,780</b>		<b>\$353,780</b>		<b>\$0</b>
General Capital Fund		\$353,780		\$353,780		\$0
<b>Shoreline Pool Demolition</b>			<b>\$620,000</b>	<b>\$620,000</b>	<b>\$620,000</b>	<b>\$620,000</b>
General Capital Fund			\$620,000	\$620,000		\$0
General Fund					\$620,000	\$620,000
<b>Civic Center / City Hall: Emergency Generator Electrical Upgrade</b>			<b>\$47,000</b>	<b>\$47,000</b>	<b>\$47,000</b>	<b>\$47,000</b>
General Capital Fund			\$47,000	\$47,000		\$0
General Fund					\$47,000	\$47,000
<b>Civic Center / City Hall: Highland Plaza</b>			<b>\$422,481</b>	<b>\$422,481</b>	<b>\$422,481</b>	<b>\$422,481</b>
General Capital Fund			\$422,481	\$422,481		\$0
General Fund					\$422,481	\$422,481

## 2021-2022 Mid-Biennial Budget Modifications (Ord. No. 945) Summary of Impacts on 2021 Plan (Attachment B)

CATEGORY						
Fund	FTE					Use of Fund
Department/Program	Change	Revenues	Transfers In	Expenditures	Transfers Out	Balance
<b>Civic Center / City Hall: Hybrid Conference Rooms</b>			\$410,000	\$419,230	\$410,000	\$410,000
General Capital Fund			\$410,000	\$410,000		\$0
General Fund				\$9,230	\$410,000	\$410,000
<b>Paramount Open Space House Demolition</b>			\$180,248	\$180,248	\$180,248	\$180,248
General Capital Fund			\$180,248	\$180,248		\$0
Park Impact Fees Fund					\$180,248	\$180,248
<b>City Maintenance Facility</b>			\$892,896	\$932,251	\$892,896	\$932,251
General Capital Fund			\$892,896	\$932,251		\$39,355
General Fund					\$892,896	\$892,896
<b>2021-2022 CIP: CITY FACILITIES-MAJOR MAINTENANCE FUND</b>			\$846,699	\$846,699	\$846,699	\$846,699
<b>Richmond Highland Community Center Long-Term Maintenance</b>			\$846,699	\$846,699	\$846,699	\$846,699
General Fund					\$846,699	\$846,699
City Facility-Major Maintenance Fund			\$846,699	\$846,699		\$0
<b>2021-2022 CIP: ROADS CAPITAL FUND</b>		\$1,239,205	\$196,392	(\$565,665)	\$196,392	\$429,126
<b>Annual Road Surface Maintenance (ARSM)</b>		\$779,205		\$205,209		\$0
Roads Capital Fund		\$779,205		\$205,209		\$0
<b>Trail Along the Rail</b>			\$196,392	\$429,126	\$196,392	\$429,126
General Fund					\$196,392	\$196,392
Roads Capital Fund			\$196,392	\$429,126		\$232,734
<b>New Sidewalks Program</b>		\$460,000		(\$1,200,000)		\$0
Roads Capital Fund		(\$1,200,000)		(\$1,200,000)		\$0
TBD Fund		\$1,660,000				\$0
<b>2021-2022 CIP: SURFACE WATER UTILITY FUND</b>		\$250,000		\$1,025,300		\$0
<b>Pump Station 26 Improvements</b>		\$250,000		\$1,025,300		\$0
Surface Water Utility Fund		\$250,000		\$1,025,300		\$0

## 2021-2022 Mid-Biennial Budget Modifications (Ord. No. 945) Summary of Impacts on 2022 Plan (Attachment C)

CATEGORY						
Fund						Use of Fund
Department/Program	FTE Chang	Revenues	Transfers In	Expenditures	Transfers Out	Balance
<b>EMERGING ISSUES IMPACTING MULTIPLE FUNDS</b>		<b>\$15,374</b>	<b>\$20,305</b>	<b>\$695,584</b>	<b>\$20,305</b>	<b>\$132,352</b>
<b>Electric Pickup for Parks Operations</b>		<b>\$9,392</b>	<b>\$14,905</b>	<b>\$25,600</b>	<b>\$14,905</b>	<b>\$14,905</b>
Equipment Replacement Fund		\$8,089	\$14,905	\$14,905		\$0
General Fund				\$9,392	\$14,905	\$14,905
Vehicle O&M Fund		\$1,303		\$1,303		\$0
<b>Wastewater Utility Vehicle Acquisitions</b>		<b>\$5,982</b>		<b>\$119,611</b>		<b>\$107,647</b>
Vehicle O&M Fund		\$5,982		\$5,982		\$0
Wastewater Utility Fund				\$113,629		\$107,647
<b>Grounds Maintenance Small Tools and Equipment</b>			<b>\$5,400</b>	<b>\$17,800</b>	<b>\$5,400</b>	<b>\$9,800</b>
General Fund				\$6,750	\$5,400	\$4,950
Street Fund			\$5,400	\$5,400		\$0
Surface Water Utility Fund				\$5,650		\$4,850
<b>VLF Bond Debt Service</b>				<b>\$532,573</b>		<b>\$0</b>
VLF Revenue Bond Fund				\$532,573		\$0
<b>EMERGING ISSUES IMPACTING THE GENERAL FUND</b>				<b>\$90,000</b>		<b>\$90,000</b>
<b>2024 Comprehensive Plan Update</b>				<b>\$90,000</b>		<b>\$90,000</b>
General Fund				\$90,000		\$90,000
<b>PERSONNEL</b>	<b>7.500</b>	<b>\$19,955</b>	<b>\$171,329</b>	<b>\$451,165</b>	<b>\$171,329</b>	<b>\$277,817</b>
<b>Engineer II - Capital Projects (1.00 FTE)</b>	<b>1.000</b>			<b>\$0</b>		<b>\$0</b>
Roads Capital Fund	0.500			\$0		\$0
Surface Water Utility Fund	0.500			\$0		\$0
<b>Grounds Maintenance Worker I (1.000 FTE)</b>	<b>1.000</b>		<b>\$5,692</b>	<b>\$51,612</b>	<b>\$5,692</b>	<b>\$5,720</b>
General Fund	0.500			\$38,266	\$5,692	\$5,148
Street Fund	0.400		\$5,692	\$5,692		\$0
Surface Water Utility Fund	0.100			\$7,654		\$572



2021-2022 Mid-Biennial Budget Modifications (Ord. No. 945) Summary of Impacts on 2022 Plan (Attachment C)

CATEGORY						
Fund						Use of Fund
Department/Program	FTE Chang	Revenues	Transfers In	Expenditures	Transfers Out	Balance
<b>Grounds Maintenance Worker I (Electric Pickup &amp; Charging Station)</b>		\$16,964	\$165,637	\$132,232	\$165,637	\$119,216
Equipment Replacement Fund		\$15,161	\$113,465	\$113,465		\$0
General Fund				\$8,482	\$108,905	\$107,870
Street Fund			\$52,172	\$6,786	\$45,386	\$0
Surface Water Utility Fund				\$1,696	\$11,346	\$11,346
Vehicle O&M Fund		\$1,803		\$1,803		\$0
<b>Extra Help Conversion to GIS Technician (0.50 FTE)</b>	<b>0.500</b>			<b>\$0</b>		<b>\$0</b>
General Fund	0.500			\$0		\$0
<b>IT Specialist (0.50 FTE) Increase to 1.00 FTE</b>	<b>0.500</b>			<b>\$48,915</b>		<b>\$0</b>
General Fund	0.500			\$48,915		\$0
<b>Temporary FTE Increase for Youth and Teen Development P</b>	<b>0.500</b>			<b>\$93,658</b>		<b>\$93,658</b>
General Fund	0.500			\$93,658		\$93,658
<b>Wastewater Utility: Engineer II - Wastewater (2.00 FTE); Cor</b>	<b>4.000</b>	<b>\$2,991</b>		<b>\$124,748</b>		<b>\$59,223</b>
General Fund	0.500			\$60,320		\$3,686
Surface Water Utility Fund	0.025			\$2,909		\$0
Vehicle O&M Fund		\$2,991		\$2,991		\$0
Wastewater Utility Fund	3.475			\$58,528		\$55,537
<b>EMERGING ISSUES IMPACTING THE WASTEWATER UTILITY FUND</b>		<b>\$480,000</b>		<b>\$598,000</b>		<b>\$118,000</b>
<b>Digitizing Ronald Wastewater District Records</b>				<b>\$48,000</b>		<b>\$48,000</b>
Wastewater Utility Fund				\$48,000		\$48,000
<b>King County Treatment Fee Increase for Wastewater Utility</b>		<b>\$480,000</b>		<b>\$480,000</b>		<b>\$0</b>
Wastewater Utility Fund		\$480,000		\$480,000		\$0
<b>Wastewater Utility 2022 Rate Study</b>				<b>\$70,000</b>		<b>\$70,000</b>
Wastewater Utility Fund				\$70,000		\$70,000

## 2021-2022 Mid-Biennial Budget Modifications (Ord. No. 945) Summary of Impacts on 2022 Plan (Attachment C)

CATEGORY						
Fund						Use of Fund
Department/Program	TE Chang	Revenues	Transfers In	Expenditures	Transfers Out	Balance
<b>MID-BIENNIAL BUDGET "TRUE-UPS" IMPACTING MULTIPLE FUNDS</b>		<b>(\$138,233)</b>	<b>\$296,356</b>	<b>(\$162,153)</b>	<b>\$296,356</b>	<b>(\$145,625)</b>
<b>Durable Pavement Marking (Thermoplastic) Maintenance</b>		<b>\$1,000</b>	<b>(\$7,920)</b>	<b>(\$22,920)</b>	<b>(\$7,920)</b>	<b>\$0</b>
Equipment Replacement Fund		\$1,000	(\$7,920)	(\$7,920)		\$0
General Fund				(\$15,000)	(\$7,920)	\$0
<b>Surface Water Equipment Replacement Charges</b>		<b>(\$24,619)</b>		<b>(\$24,619)</b>		<b>\$0</b>
Equipment Replacement Fund		(\$24,619)				\$0
Surface Water Utility Fund				(\$24,619)		\$0
<b>Wastewater Equipment Replacement and Vehicle Operations/Maintenance (O&amp;M Charges)</b>		<b>(\$114,614)</b>		<b>(\$114,614)</b>		<b>(\$145,625)</b>
Equipment Replacement Fund		(\$145,625)				\$0
Vehicle O&M Fund		\$31,011		\$31,011		\$0
Wastewater Utility Fund				(\$145,625)		(\$145,625)
<b>2022 General Fund Overhead Update</b>			<b>\$304,276</b>		<b>\$304,276</b>	<b>\$0</b>
General Capital Fund					\$39,735	\$0
General Fund			\$254,185		\$50,091	\$0
Roads Capital Fund					(\$15,543)	\$0
Street Fund			\$50,091		\$50,091	\$0
Surface Water Utility Fund					\$23,214	\$0
Wastewater Utility Fund					\$156,688	\$0
<b>MID-BIENNIAL BUDGET "TRUE-UPS" IMPACTING THE GENERAL FUND</b>	<b>0.000</b>	<b>\$2,427,028</b>			<b>\$48,752</b>	<b>\$0</b>
<b>Property Management Lease Revenue</b>		<b>(\$28,428)</b>				<b>\$0</b>
General Fund		(\$28,428)				\$0
<b>General Fund Revenues</b>	<b>0.000</b>	<b>\$2,455,456</b>			<b>\$48,752</b>	<b>\$0</b>
General Fund	0.000	\$2,455,456			\$48,752	\$0

## 2021-2022 Mid-Biennial Budget Modifications (Ord. No. 945) Summary of Impacts on 2022 Plan (Attachment C)

CATEGORY						
Fund						Use of Fund
Department/Program	FTE Chang	Revenues	Transfers In	Expenditures	Transfers Out	Balance
<b>AMERICAN RESCUE PLAN ACT (ARPA)</b>	<b>1.400</b>	<b>\$398,572</b>		<b>\$398,572</b>		<b>\$0</b>
<b>ARPA: 1.40 FTE Limited-Term ARPA Navigators</b>	<b>1.400</b>	<b>\$175,572</b>		<b>\$175,572</b>		<b>\$0</b>
General Fund	1.400	\$175,572		\$175,572		\$0
<b>ARPA: Outreach and Analysis to Shoreline Businesses Through a Part</b>		<b>\$31,000</b>		<b>\$31,000</b>		<b>\$0</b>
General Fund		\$31,000		\$31,000		\$0
<b>ARPA: Community and Youth Recovery</b>		<b>\$192,000</b>		<b>\$192,000</b>		<b>\$0</b>
General Fund		\$192,000		\$192,000		\$0
<b>MID-BIENNIAL BUDGET "TRUE-UPS" IMPACTING THE STREET FUND</b>	<b>0.000</b>	<b>(\$48,752)</b>	<b>\$48,752</b>			<b>\$0</b>
<b>Street Fund Revenues</b>	<b>0.000</b>	<b>(\$48,752)</b>	<b>\$48,752</b>			<b>\$0</b>
Street Fund	0.000	(\$48,752)	\$48,752			\$0
<b>2021-2022 CIP: GENERAL CAPITAL FUND</b>				<b>\$250,000</b>		<b>\$250,000</b>
<b>Parks, Recreation and Open Space (PROS) Plan Update</b>				<b>\$250,000</b>		<b>\$250,000</b>
General Capital Fund				\$250,000		\$250,000
<b>2021-2022 CIP: ROADS CAPITAL FUND</b>		<b>\$5,725,605</b>	<b>\$3,914,266</b>	<b>\$8,066,777</b>	<b>\$3,914,266</b>	<b>\$0</b>
<b>145th and I-5 Interchange Design and Environmental Review</b>		<b>\$3,000,000</b>				<b>\$0</b>
Roads Capital Fund		\$3,000,000				\$0
<b>Annual Road Surface Maintenance (ARSM)</b>		<b>\$1,350,000</b>		<b>\$381,550</b>		<b>\$0</b>
Roads Capital Fund		\$1,350,000		\$381,550		\$0
<b>Sidewalk Rehabilitation Program</b>		<b>\$2,147,882</b>		<b>\$1,503,238</b>		<b>\$0</b>
Roads Capital Fund		\$2,147,882		\$1,503,238		\$0
<b>20th Avenue NW (NW 190-195) New Sidewalks</b>		<b>\$1,335,000</b>		<b>\$1,335,000</b>		<b>\$0</b>
Sidewalk Expansion Fund		\$1,335,000		\$1,335,000		\$0
<b>N 175th Street (Stone Way to I-5)</b>		<b>(\$267,277)</b>	<b>\$3,914,266</b>	<b>\$3,646,989</b>	<b>\$3,914,266</b>	<b>\$0</b>
Roads Capital Fund		(\$267,277)	\$3,914,266	\$3,646,989		\$0
Transportation Impact Fees Fund					\$3,914,266	\$0
<b>New Sidewalks Program</b>		<b>(\$1,840,000)</b>		<b>\$1,200,000</b>		<b>\$0</b>
Roads Capital Fund		(\$3,500,000)		(\$3,500,000)		\$0
Sidewalk Expansion Fund				\$4,700,000		\$0
TBD Fund		\$1,660,000				\$0

2021-2022 Mid-Biennial Budget Modifications (Ord. No. 945) Summary of Impacts on 2022 Plan (Attachment C)

CATEGORY						
Fund						Use of Fund
Department/Program	TE Chang	Revenues	Transfers In	Expenditures	Transfers Out	Balance
<b>2021-2022 CIP: SURFACE WATER UTILITY FUND</b>		<b>\$220,000</b>	<b>\$50,000</b>	<b>\$570,000</b>	<b>\$50,000</b>	<b>\$350,000</b>
<b>Barnacle Creek</b>				<b>\$250,000</b>		<b>\$250,000</b>
Surface Water Utility Fund				\$250,000		\$250,000
<b>Storm Creek</b>		<b>\$220,000</b>	<b>\$50,000</b>	<b>\$320,000</b>	<b>\$50,000</b>	<b>\$100,000</b>
Surface Water Utility Fund		\$220,000	\$50,000	\$320,000		\$50,000
Wastewater Utility Fund					\$50,000	\$50,000

Impact of 2021-2022 Mid-Biennial Budget Modifications (Ord. No. 945) on Fund Balance (Attachment D)

FUND	2021 Beginning Fund Balance	2021-2022 Current	2021-2022	2021-2022	2021-2022 Current	2021-2022	2021-2022	2022
		Revenues / Transfers In	Mid-Biennial Update Revenues / Transfers In	Amended Revenues / Transfers In	Expenditures / Transfers Out	Mid-Biennial Update Expenditures / Transfers Out	Amended Expenditures / Transfers Out	Projected Ending Fund Balance
		Ord. No. 923	Ord. No. 945	Ord. No. 945	Ord. No. 923	Ord. No. 945	Ord. No. 945	
	(A)	(B)	(C)	(D) = (B) + (C)	(E)	(F)	(G) = (E) + (F)	(H) = (A) + (D) - (G)
<b>OPERATING FUNDS</b>								
General Fund	\$26,132,527	\$89,888,655	\$6,977,284	\$96,865,939	\$97,782,109	\$5,375,652	\$103,157,761	\$19,840,705
Shoreline Secure Storage Fund	\$224,920	\$2,259,500	\$0	\$2,259,500	\$2,259,500	\$0	\$2,259,500	\$224,920
Revenue Stabilization Fund	\$5,626,456	\$0	\$0	\$0	\$0	\$0	\$0	\$5,626,456
Street Fund	\$259,905	\$4,159,609	\$113,355	\$4,272,964	\$4,159,609	\$113,355	\$4,272,964	\$259,905
Code Abatement Fund	\$428,409	\$60,000	\$0	\$60,000	\$200,000	\$0	\$200,000	\$288,409
State Drug Enforcement Forfeiture Fund	\$88,545	\$36,486	\$0	\$36,486	\$36,486	\$0	\$36,486	\$88,545
Public Arts Fund	\$181,009	\$22,000	\$0	\$22,000	\$161,505	\$0	\$161,505	\$41,504
Federal Drug Enforcement Forfeiture Fund	\$23,049	\$26,000	\$0	\$26,000	\$26,000	\$0	\$26,000	\$23,049
<b>DEBT SERVICE FUNDS</b>								
2006/2016 UTGO Bond Fund	\$6,656	\$1,135,144	\$0	\$1,135,144	\$1,135,144	\$0	\$1,135,144	\$6,656
2009/2019 LTGO Bond Fund	\$410,709	\$2,202,688	\$0	\$2,202,688	\$2,202,688	\$0	\$2,202,688	\$410,709
2013 LTGO Bond Fund	\$0	\$516,520	\$0	\$516,520	\$516,520	\$0	\$516,520	\$0
2020 LTGO Bond Fund	\$0	\$25,960,000	\$0	\$25,960,000	\$25,960,000	\$0	\$25,960,000	\$0
Sidewalk LTGO Bond Fund	\$3,833,167	\$4,394,202	\$0	\$4,394,202	\$1,799,100	\$0	\$1,799,100	\$6,428,269
VLF Revenue Bond Fund	\$0	\$0	\$552,573	\$552,573	\$0	\$552,573	\$552,573	\$0
<b>CAPITAL FUNDS</b>								
General Capital Fund	\$10,181,482	\$9,464,022	\$3,368,405	\$12,832,427	\$17,785,874	\$3,697,495	\$21,483,369	\$1,530,540
City Facility-Major Maintenance Fund	\$197,080	\$750,392	\$846,699	\$1,597,091	\$709,226	\$846,699	\$1,555,925	\$238,246
Roads Capital Fund	\$121,837,112	\$137,841,234	\$186,299,665	\$178,590,974	\$118,531,332	\$75,040,175	\$73,037,033	\$14,772,938
Sidewalk Expansion Fund	\$11,321,491	\$5,731,781	\$1,335,000	\$7,066,781	\$5,922,995	\$6,035,000	\$11,957,995	\$6,430,277
Transportation Impact Fees Fund	\$5,283,736	\$0	\$0	\$0	\$946,805	\$3,914,266	\$4,861,071	\$422,665
Park Impact Fees Fund	\$1,016,149	\$750,000	\$0	\$750,000	\$1,102,561	\$180,248	\$1,282,809	\$483,340
<b>ENTERPRISE FUNDS</b>								
Surface Water Utility Fund	\$4,289,384	\$33,394,296	\$3,740,203	\$37,134,499	\$25,875,682	\$1,965,510	\$27,841,192	\$13,582,691
Wastewater Utility Fund	\$7,093,534	\$36,358,350	\$1,280,000	\$37,638,350	\$43,855,290	\$1,247,340	\$45,102,630	(\$370,746)
<b>INTERNAL SERVICE FUNDS</b>								
Vehicle O&M Fund	\$40,001	\$438,891	\$116,052	\$554,943	\$485,397	\$109,547	\$594,944	\$0
Equipment Replacement Fund	\$3,385,429	\$2,014,741	(\$867,150)	\$1,147,591	\$684,468	\$52,302	\$736,770	\$3,796,250
Unemployment Fund	\$0	\$35,000	\$0	\$35,000	\$35,000	\$0	\$35,000	\$0
<b>TOTAL</b>	<b>\$89,010,288</b>	<b>\$273,908,192</b>	<b>\$27,202,889</b>	<b>\$301,111,081</b>	<b>\$289,902,912</b>	<b>\$26,093,129</b>	<b>\$315,996,041</b>	<b>\$74,125,328</b>

**CITY COUNCIL AGENDA ITEM**  
CITY OF SHORELINE, WASHINGTON

<b>AGENDA TITLE:</b>	Adoption of Ordinance No. 946 – Setting the 2022 Regular Property Tax Levy
<b>DEPARTMENT:</b>	Administrative Services
<b>PRESENTED BY:</b>	Sara Lane, Administrative Services Director Rick Kirkwood, Budget & Tax Manager
<b>ACTION:</b>	<input checked="" type="checkbox"/> Ordinance <input type="checkbox"/> Resolution <input type="checkbox"/> Motion <input type="checkbox"/> Discussion <input type="checkbox"/> Public Hearing

**PROBLEM/ISSUE STATEMENT:**

State law requires that a mid-biennial budget review be completed during the first year of the biennium between September 1 and December 31. At the November 1, 2021 City Council Regular Meeting, the City Council was presented a brief financial update, recommended adjustments to the 2021-2022 Biennial Budget, and provided information on related policy issues. The link to the staff report for this Council discussion is available here:

<http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/council/staffreports/2021/staffreport110121-9a.pdf>.

At the November 8, 2021 City Council Regular Meeting, the City Council conducted public hearings on the 2021-2022 Biennial Budget and the 2021-2026 Capital Improvement Plan Mid-Biennial Update required by state law (RCW 35A.34.130) for the purpose of modifying the City’s biennial budget prior to the City Council’s adoption of proposed Ordinance No. 945, providing for the mid-biennial budget modifications, proposed Ordinance No. 946, setting the 2022 regular property tax levy, proposed Ordinance No. 947, setting the 2022 fee schedule for impact fees, and proposed Resolution No. 484, setting the 2022 fee schedule for rates, fees and charges for services. The links to the staff reports are available here:

<http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/council/staffreports/2021/staffreport110821-8a.pdf> and

<http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/council/staffreports/2021/staffreport110821-8b.pdf>.

The public hearings enabled the City Council and City management to hear public comment prior to adoption of the City’s 2021-2022 Budget and 2021-2026 Capital Improvement Plan (CIP) Mid-Biennial Budget Update. This staff report has been issued prior to the public hearings, during which the City Council may have asked for additional information and discussed potential changes to the proposed mid-biennium budget modification, including all proposed levies, taxes, fees, and rates. The questions asked and amendments proposed will be addressed during tonight’s presentation prior to the

scheduled adoption of proposed Ordinance No. 946 establishing the City's 2022 regular property tax levy.

**Regular Property Tax Levy**

State law (RCW 84.55.0101) limits the annual growth of the City's highest regular property tax levy to the lower of the Implicit Price Deflator (IPD) or 1% without voter approval. Since the City belongs to both a fire district and library district, the levy rate is also limited to \$1.60 per \$1,000 of assessed valuation (AV) if these districts are levying their maximum amount. However, the City's Proposition 1 in 2016 included a provision to raise the annual 1% limitation to an annual escalator based upon the June-to-June percentage change of the Consumer Price Index for all Urban Consumers for the Seattle-Tacoma-Bellevue area (CPI-U) in accordance with RCW 84.55.050. The City is able to apply the annual increase percentage of 5.52134% for 2022 to the City's highest regular property tax levy of \$14,227,246 for 2021 and add the new construction levy and a one-time releveling for prior year refunds. It is important to note that because of the City's Proposition 1 approved by voters in 2016, the regular property tax levy should be established annually even though the City Council adopted a budget for the 2021-2022 biennium on November 16, 2020 and subsequently amended through April 2021.

Based on the latest information provided by the King County Assessor's Office, the regular property tax levy represents a dollar increase of \$785,535 and a percentage increase of 5.52134% from the levy amount of the previous year, excluding the addition of new construction, improvements to property, any increase in the value of state assessed property, and administrative refunds made as shown below:

	<u>Amount</u>
<b>2022 Regular Levy</b>	<b>\$15,248,023</b>
Less 2021 Levy	14,227,246
Less New Construction	200,000
<u>Less Refunds</u>	<u>35,242</u>
<b>Total Increase</b>	<b>\$785,535</b>
<b>Percent Increase</b>	<b>5.52134%</b>

**FINANCIAL IMPACT:**

It is anticipated the 2022 Regular Levy will total approximately \$15.248 million. Based on the latest information provided by the King County Assessor's Office, the regular property tax levy represents a dollar increase of \$785,535 and a percentage increase of 5.52134 percent from the levy amount of the previous year, excluding the addition of new construction, improvements to property, any increase in the value of state assessed property, and administrative refunds.

**RECOMMENDATION**

Staff recommends that the City Council adopt Ordinance No. 946 establishing the City's 2022 regular property tax levy.

**ATTACHMENTS:**

Attachment A: Proposed Ordinance No. 946 setting the 2022 regular property tax levy

Approved By: City Manager **DT** City Attorney **MK**

**ORDINANCE NO. 946**

**AN ORDINANCE OF THE CITY OF SHORELINE, WASHINGTON LEVYING THE GENERAL TAXES FOR THE CITY OF SHORELINE IN KING COUNTY FOR THE FISCAL YEAR COMMENCING JANUARY 1, 2022, THE SECOND YEAR OF THE CITY OF SHORELINE'S 2021-2022 FISCAL BIENNIUM, ON ALL PROPERTY BOTH REAL AND PERSONAL, IN SAID CITY, WHICH IS SUBJECT TO TAXATION FOR THE PURPOSE OF PROVIDING SUFFICIENT REVENUE TO CONDUCT CITY BUSINESS FOR THE SAID FISCAL YEAR AS REQUIRED BY LAW.**

WHEREAS, pursuant to RCW 35A.33.135, the City Council for the City of Shoreline and the City Manager have considered the City's anticipated financial requirements for 2022 and the amounts necessary and available to be raised by ad valorem taxes on real, personal, and utility property; and

WHEREAS, pursuant to RCW 84.55.120, a properly noticed public hearing was held on November 8, 2021 to consider the revenue sources including the 2022 regular property tax levy; and

WHEREAS, on November 8, 2016, Shoreline Proposition No. 1 (Basic Public Safety, Parks & Recreation, and Community Services Maintenance and Operations Levy) limiting annual levy increases for the years 2018 to 2022 to the June-to-June percentage change in the Seattle/Tacoma/Bellevue CPI-U was approved by the voters; and

WHEREAS, the maximum change from the 2021 levy to be used for calculating the 2022 regular levy, in addition to new construction, is based on the CPI-U index change from June 2020 to June 2021 which is 5.52134 percent, applied to the City's highest previous levy of \$14,227,246.00;

**NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF SHORELINE, WASHINGTON, DO ORDAIN AS FOLLOWS:**

**Section 1. Regular Property Tax Levy.** Based on the voter-approved limitation on annual levy increases, the City Council of the City of Shoreline has determined that the property tax levy for the year 2022 is fixed and established in the amount of \$15,248,023.00. This property tax levy, excluding the addition of new construction, improvements to property, any increase in the value of state assessed property, any annexations that have occurred, and administrative refunds made represents a dollar increase of \$785,535.00 and a percentage increase of 5.52134 percent from the levy amount of the previous year, as shown below:

	<b>Amount</b>
<b>2022 Regular Levy</b>	<b>\$15,248,023</b>
Less 2021 Levy	14,227,246
Less New Construction	200,000
Less Refunds	35,242
<b>Total Increase</b>	<b>785,535</b>
<b>Percent Increase</b>	<b>5.52%</b>



**Section 2. Notice to King County.** This Ordinance shall be certified to the proper County officials, as provided by law, and taxes herein levied shall be collected to pay to the Administrative Services Department of the City of Shoreline at the time and in the manner provided by the laws of the State of Washington for the collection of taxes for non-charter code cities.

**Section 3. Corrections by City Clerk or Code Reviser.** Upon approval of the City Attorney, the City Clerk and/or the Code Reviser are authorized to make necessary corrections to this Ordinance, including the corrections of scrivener or clerical errors; references to other local, state, or federal laws, codes, rules, or regulations; or ordinance numbering and section/subsection numbering and references.

**Section 4. Severability.** Should any section, paragraph, sentence, clause or phrase of this Ordinance, or its application to any person or circumstance, be declared unconstitutional or otherwise invalid for any reason, or should any portion of this Ordinance be preempted by State or Federal law or regulation, such decision or preemption shall not affect the validity of the remaining portions of this Ordinance or its application to other persons or circumstances.

**Section 5. Effective Date.** This Ordinance shall be in full force five days after publication of this Ordinance, or a summary consisting of its title, in the official newspaper of the City, as provided by law.

**ADOPTED BY THE CITY COUNCIL ON NOVEMBER 15, 2021.**

\_\_\_\_\_  
Mayor Will Hall

**ATTEST:**

**APPROVED AS TO FORM:**

\_\_\_\_\_  
Jessica Simulcik Smith  
City Clerk

\_\_\_\_\_  
Margaret King  
City Attorney

Date of Publication:           , 2021  
Effective Date:                 , 2021

**CITY COUNCIL AGENDA ITEM**  
CITY OF SHORELINE, WASHINGTON

<b>AGENDA TITLE:</b>	Adoption of Ordinance No. 947 – Setting a Fee Schedule for Impact Fees
<b>DEPARTMENT:</b>	Administrative Services
<b>PRESENTED BY:</b>	Sara Lane, Administrative Services Director Rick Kirkwood, Budget & Tax Manager
<b>ACTION:</b>	<input checked="" type="checkbox"/> Ordinance <input type="checkbox"/> Resolution <input type="checkbox"/> Motion <input type="checkbox"/> Discussion <input type="checkbox"/> Public Hearing

**PROBLEM/ISSUE STATEMENT:**

State law requires that a mid-biennial budget review be completed during the first year of the biennium between September 1 and December 31. At the November 1, 2021 City Council Regular Meeting, the City Council was presented a brief financial update, recommended adjustments to the 2021-2022 Biennial Budget, and provided information on related policy issues. The link to the staff report for this Council discussion is available here:

<http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/council/staffreports/2021/staffreport110121-9a.pdf>.

At the November 8, 2021 City Council Regular Meeting, the City Council conducted public hearings on the 2021-2022 Biennial Budget and the 2021-2026 Capital Improvement Plan Mid-Biennial Update required by state law (RCW 35A.34.130) for the purpose of modifying the City’s biennial budget prior to the City Council’s adoption of proposed Ordinance No. 945, providing for the mid-biennial budget modifications, proposed Ordinance No. 946, setting the 2022 regular property tax levy, proposed Ordinance No. 947, setting the 2022 fee schedule for impact fees, and proposed Resolution No. 484, setting the 2022 fee schedule for rates, fees and charges for services. The links to the staff reports are available here:

<http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/council/staffreports/2021/staffreport110821-8a.pdf> and

<http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/council/staffreports/2021/staffreport110821-8b.pdf>.

The public hearings enabled the City Council and City management to hear public comment prior to adoption of the City’s 2021-2022 Budget and 2021-2026 Capital Improvement Plan (CIP) Mid-Biennial Budget Update. This staff report has been issued prior to the public hearings, during which the City Council may have asked for additional information and discussed potential changes to the proposed mid-biennium budget modification, including all proposed levies, taxes, fees, and rates. The questions asked and amendments proposed will be addressed during tonight’s presentation prior to the

scheduled adoption of proposed Ordinance No. 947 adopting the rates and costs for all the City's impact fees (parks, transportation, and fire). At this time, there have been no proposed adjustments to proposed Ordinance No. 947.

**FINANCIAL IMPACT:**

There is no financial impact associated with tonight's action.

**RECOMMENDATION**

Staff recommends that the City Council adopt Ordinance No. 947, setting the 2022 fee schedule for Impact Fees.

**ATTACHMENTS:**

Attachment A: Proposed Ordinance No. 947 and Exhibit A adopting the 2022 fee schedule for Impact Fees for Transportation, Parks, and Fire

Approved By:           City Manager **DT**   City Attorney **MK**

**ORDINANCE NO. 947**

**AN ORDINANCE OF THE CITY OF SHORELINE, WASHINGTON ESTABLISHING A FEE SCHEDULE FOR THE CITY’S PARKS, FIRE, AND TRANSPORTATION IMPACT FEES.**

WHEREAS, the City of Shoreline is a non-charter optional municipal code city as provided in Title 35A RCW, incorporated under the laws of the state of Washington; and

WHEREAS, RCW Chapter 82.02, the impact fee statute, requires that when imposing impact fees, that act needs to be by local ordinance; and

WHEREAS, the City Council has considered proposed mid-biennial budget modification and has considered any and all comments received from the public, written or oral, with regard to such proposed mid-biennial budget modifications;

**NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF SHORELINE, WASHINGTON, DO ORDAIN AS FOLLOWS:**

**Section 1. Adoption of the Fee Schedule for Parks, Fire, and Transportation Impact Fees.** The 2022 Fee Schedule for Parks, Fire, and Transportation Impact Fees as set forth in Exhibit A to this Ordinance is adopted.

**Section 2. Corrections by City Clerk or Code Reviser.** Upon approval of the City Attorney, the City Clerk and/or the Code Reviser are authorized to make necessary corrections to this Ordinance, including the corrections of scrivener or clerical errors; references to other local, state, or federal laws, codes, rules, or regulations; or ordinance numbering and section/subsection numbering and references.

**Section 3. Severability.** Should any section, paragraph, sentence, clause or phrase of this Ordinance, or its application to any person or circumstance, be declared unconstitutional or otherwise invalid for any reason, or should any portion of this Ordinance be preempted by State or Federal law or regulation, such decision or preemption shall not affect the validity of the remaining portions of this ordinance or its application to other persons or circumstances.

**Section 4. Publication and Effective Date.** This Ordinance shall take effect at 12:01 a.m. January 1, 2022.

**ADOPTED BY THE CITY COUNCIL ON NOVEMBER 15, 2021.**

\_\_\_\_\_  
Mayor Will Hall

**ATTEST:**

**APPROVED AS TO FORM:**

\_\_\_\_\_  
Jessica Simulcik Smith  
City Clerk

\_\_\_\_\_  
Margaret King  
City Attorney

Date of Publication: , 2021  
Effective Date: , 2021

## City of Shoreline Fee Schedules

**Owner: Public Works**  
**Transportation Impact Fees**

ITE Code	Land Use Category/Description	2022 Adopted
		Impact Fee Per Unit @
		\$8,322.31 per Trip
<b>A. Rate Table</b>		
90	Park-and-ride lot w/ bus svc	3,944.78 per parking space
110	Light industrial	10.78 per square foot
140	Manufacturing	8.12 per square foot
151	Mini-warehouse	2.89 per square foot
210	Single family house Detached House	7,711.40 per dwelling unit
220	Low-Rise Multifamily (Apartment, condo, townhome, ADU)	4,996.72 per dwelling unit
240	Mobile home park	3,603.74 per dwelling unit
251	Senior housing	1,649.17 per dwelling unit
254	Assisted Living	755.86 per bed
255	Continuing care retirement	2,460.18 per dwelling unit
310	Hotel	5,155.36 per room
320	Motel	4,106.81 per room
444	Movie theater	16.16 per square foot
492	Health/fitness club	21.29 per square foot
530	School (public or private)	6.26 per square foot
540	Junior/community college	16.37 per square foot
560	Church	4.21 per square foot
565	Day care center	40.43 per square foot
590	Library	20.43 per square foot
610	Hospital	9.90 per square foot
710	General office	14.90 per square foot
720	Medical office	27.08 per square foot
731	State motor vehicles dept	130.49 per square foot
732	United States post office	31.14 per square foot
820	General retail and personal services (includes shopping center)	11.27 per square foot
841	Car sales	20.73 per square foot
850	Supermarket	30.79 per square foot
851	Convenience market-24 hr	57.22 per square foot
854	Discount supermarket	31.40 per square foot
880	Pharmacy/drugstore	18.13 per square foot
912	Bank	44.12 per square foot
932	Restaurant: sit-down	31.82 per square foot
934	Fast food	73.20 per square foot
937	Coffee/donut shop	92.87 per square foot
941	Quick lube shop	33,021.62 per service bay
944	Gas station	30,028.04 per pump
948	Automated car wash	64.19 per square foot
<b>B. Administrative Fees - See Planning and Community Development</b>		

**City of Shoreline  
Fee Schedules**

**Park Impact Fees**

		<b>2022 Adopted</b>
<b>A. Rate Table</b>		
<b>Use Category</b>	<b>Impact Fee</b>	
Single Family Residential	\$4,692 per dwelling unit	
Multi-Family Residential	\$3,077 per dwelling unit	
<b>B. Administrative Fees - See Planning and Community Development</b>		

**City of Shoreline  
Fee Schedules**

**Fire Impact Fees**

		<b>2022 Adopted</b>
<b>A. Rate Table</b>		
<b>Use Category</b>	<b>Impact Fee</b>	
<b>Residential</b>		
Single-Family Residential	\$2,311.00 per dwelling unit	
Multi-Family Residential	\$2,002.00 per dwelling unit	
<b>Commercial</b>		
Commercial 1	\$2.84 per square foot	
Commercial 2	\$1.83 per square foot	
Commercial 3	\$5.73 per square foot	
<b>B. Administrative Fees - See Planning and Community Development</b>		



**CITY COUNCIL AGENDA ITEM**  
CITY OF SHORELINE, WASHINGTON

<b>AGENDA TITLE:</b>	Adoption of Resolution No. 484 – Setting the 2022 Fee Schedule
<b>DEPARTMENT:</b>	Administrative Services
<b>PRESENTED BY:</b>	Sara Lane, Administrative Services Director Rick Kirkwood, Budget & Tax Manager
<b>ACTION:</b>	<input type="checkbox"/> Ordinance <input checked="" type="checkbox"/> Resolution <input type="checkbox"/> Motion <input type="checkbox"/> Discussion <input type="checkbox"/> Public Hearing

**PROBLEM/ISSUE STATEMENT:**

State law requires that a mid-biennial budget review be completed during the first year of the biennium between September 1 and December 31. At the November 1, 2021 City Council Regular Meeting, the City Council was presented a brief financial update, recommended adjustments to the 2021-2022 Biennial Budget, and provided information on related policy issues. The link to the staff report for this Council discussion is available here:

<http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/council/staffreports/2021/staffreport110121-9a.pdf>.

At the November 8, 2021 City Council Regular Meeting, the City Council conducted public hearings on the 2021-2022 Biennial Budget and the 2021-2026 Capital Improvement Plan Mid-Biennial Update required by state law (RCW 35A.34.130) for the purpose of modifying the City’s biennial budget prior to the City Council’s adoption of proposed Ordinance No. 945, providing for the mid-biennial budget modifications, proposed Ordinance No. 946, setting the 2022 regular property tax levy, proposed Ordinance No. 947, setting the 2022 fee schedule for impact fees, and proposed Resolution No. 484, setting the 2022 fee schedule for rates, fees and charges for services. The links to the staff reports are available here:

<http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/council/staffreports/2021/staffreport110821-8a.pdf> and

<http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/council/staffreports/2021/staffreport110821-8b.pdf>

The public hearings enabled the City Council and City management to hear public comment prior to adoption of the City’s 2021-2022 Budget and 2021-2026 Capital Improvement Plan (CIP) Mid-Biennial Budget Update. This staff report has been issued prior to the public hearings, during which the City Council may ask for additional information and discuss potential changes to the proposed mid-biennium budget modification, including all proposed levies, taxes, fees, and rates. One change that staff will address during the presentation for the public hearing and is reflected in the Exhibit A presented for adoption is an addition to the Surface Water Management Rate Table

that is necessary to comply with Revised Code of Washington (RCW) 35.67.020(3). The questions asked and amendments proposed will be addressed during tonight's presentation prior to the scheduled adoption of proposed Resolution No. 484 adopting the rates, fees and charges for services.

**FINANCIAL IMPACT:**

There is no financial impact associated with tonight's action.

**RECOMMENDATION**

Staff recommends that the City Council adopt Resolution No. 484, setting the 2022 fee schedule.

**ATTACHMENTS:**

Attachment A: Proposed Resolution No. 484 and Exhibit A

Approved By:           City Manager **DT**   City Attorney **MK**

**RESOLUTION NO. 484**

**A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF SHORELINE, WASHINGTON, ESTABLISHING THE 2022 FEE SCHEDULE FOR FEES, RATES, COSTS, AND CHARGES PURSUANT TO CHAPTER 3.01 FEE SCHEDULE OF THE SHORELINE MUNICIPAL CODE.**

WHEREAS, the City of Shoreline is a non-charter optional municipal code city as provided in Title 35A RCW, incorporated under the laws of the State of Washington and is authorized by state law to impose fees; and

WHEREAS, various sections of the Shoreline Municipal Code (SMC) impose fees, rates, costs, and charges for services provided by the City and/or its contract service providers; and

WHEREAS, pursuant to RCW 35A.34.130, the City conducted a mid-biennial review no sooner than eight months after the start nor later than the conclusion of the first year of the fiscal biennium; and

WHEREAS, the City Council held a properly noticed public hearing on November 8, 2021 on the proposed mid-biennial budget modification; and,

WHEREAS, the City Council has considered the proposed mid-biennial budget modification and has considered any and all comments received from the public, written or oral, with regard to such proposed mid-biennial budget modification; and

WHEREAS, SMC Section 3.01.010 provides that the City Council is to establish a Fee Schedule for fees, rates, costs, and charges for services provided by the City from time to time by Resolution; and

WHEREAS, the City desires to utilize the rates, charges and fees calculated in accordance with the contract for Comprehensive Garbage, Recyclables, and Compostable Collection Services with Recology CleanScapes Inc. that are to be mailed with updated service information to customers on or before November 15, which is 45 days in advance of the new rates taking effect; and,

WHEREAS, the Fee Schedule does not exceed the actual cost of providing the services for which such fees are charged, as required by state law; and

**NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF SHORELINE, WASHINGTON, HEREBY RESOLVES:**

**Section 1. Adoption of Fee Schedule.** The Fee Schedule for Fees, Rates, Costs, and Charges as set forth in Exhibit A to this Resolution is adopted as the 2022 Fee Schedule.

**Section 2. City Manager Authorized to Amend Rate Schedule.** In accordance with the Comprehensive Garbage, Recyclables, and Compostable Collection Contract with Recology Cleanscapes Inc. and upon City review and verification, Recology will mail to customers finalized rates and updated service information on or before November 15, which is 45 days in advance of the new rates taking effect. The Council hereby authorizes the City Manager to amend the Rate Schedule to adopt, adjust, or incorporate those modified rates or fees.

**Section 3. Corrections by City Clerk or Code Reviser.** Upon approval of the City Attorney, the City Clerk and/or the Code Reviser are authorized to make necessary corrections to this Resolution, including the corrections of scrivener or clerical errors; references to other local, state, or federal laws, codes, rules, or regulations; or ordinance numbering and section/subsection numbering and references.

**Section 4. Severability.** Should any section, paragraph, sentence, clause or phrase of this Ordinance, or its application to any person or circumstance, be declared unconstitutional or otherwise invalid for any reason, or should any portion of this ordinance be preempted by state or federal law or regulation, such decision or preemption shall not affect the validity of the remaining portions of this ordinance or its application to other persons or circumstances.

**Section 5. Effective Date.** This Resolution shall take effect at 12:01 a.m. January 1, 2022.

**ADOPTED BY THE CITY COUNCIL ON NOVEMBER 15, 2021.**

\_\_\_\_\_  
Mayor Will Hall

**ATTEST:**

**APPROVED AS TO FORM:**

\_\_\_\_\_  
Jessica Simulcik Smith  
City Clerk

\_\_\_\_\_  
Margaret King  
City Attorney

Date of Publication: , 2021  
Effective Date: , 2021

**City of Shoreline  
Fee Schedules**

**Attachment A Exhibit A**

**Planning and Community Development**

Type of Permit Application	2022 Adopted
<b>A. BUILDING</b>	
Valuation (The Total Valuation is the "Building permit valuations" as delineated in section R108.3 of the International Residential Code and section 108.3 of the International Building Code. The hourly rate referenced throughout SMC 3.01.010 is calculated by multiplying the minimum number of hours noted for each fee by the fee established in SMC 3.01.010(A)(1).)	
1. \$0 - \$12,000.00	\$217.00
2. \$12,000.01 - \$25,000.00	\$75 for the first \$2,000.00 + \$14.00 for each additional 1,000.00, or fraction thereof, to and including \$25,000.00.
3. \$25,000.01 - \$50,000.00	\$397 for the first \$25,000.00 + \$11.00 for each additional \$1,000.00, or fraction thereof, to and including \$50,000.00.
4. \$50,000.01 - \$100,000.00	\$672 for the first \$50,000.00 + \$9.00 for each additional \$1,000.00, or fraction thereof, to and including \$100,000.00.
5. \$100,000.01 - \$500,000.00	\$1,122 for the first \$100,000.00 + \$7 for each additional \$1,000.00, or fraction thereof, to and including \$500,000.00.
6. \$500,000.01 - \$1,000,000.00	\$3,922 for the first \$500,000.00 + \$5 for each additional \$1,000.00, or fraction thereof, to and including \$1,000,000.00.
7. \$1,000,000.01 +	\$6,422 for the first \$1,000,000.00 + \$4 for each additional \$1,000.00, or fraction thereof.
8. Building/Structure Plan Review	65% of the building permit fee
9. Civil Plan Review, Commercial (if applicable)	Hourly rate, 12 Hour Minimum
10. Civil Plan Review, Residential (if applicable)	Hourly rate, 4 Hour Minimum
11. Civil Plan Review, Residential, up to 1,000 square feet (if applicable)	Hourly rate, 1-hour minimum
12. Floodplain Permit	\$232.00
13. Floodplain Variance	\$651.00
14. Demolition, Commercial	\$1,853.00
15. Demolition, Residential	\$695.00
16. Zoning Review	Hourly rate, 1-hour minimum
17. Affordable Housing Review	Hourly rate, 10-hour minimum
18. Temporary Certificate of Occupancy (TCO)- Single-Family	\$217.00
19. Temporary Certificate of Occupancy (TCO)- Other	\$651.00
<b>B. ELECTRICAL</b>	
1. Electrical Permit	Permit fee described in WAC 296-46B-905, plus a 20% administrative fee
<b>C. FIRE - CONSTRUCTION</b>	
1. Automatic Fire Alarm System:	
a. Existing System	
New or relocated devices up to 12 - Over the Counter	\$217.00
New or relocated devices over 12 - Full review	\$651.00 plus \$7 per device over 12
AES/Cellular Communicator - Over the Counter	\$217.00
b. New System	\$868.00
c. Each additional new or relocated device over 30	\$7.00 per device
2. Fire Extinguishing Systems:	
a. Commercial Cooking Hoods	
1 to 12 flow points	\$651.00
More than 12	\$868.00
b. Other Fixed System Locations	\$868.00
3 Fire Pumps:	
a. Commercial Systems	\$868.00

Planning and Community Development

Type of Permit Application	2022 Adopted
4. Commercial Flammable/Combustible Liquids:	
a. Aboveground Tank Installations	
First tank	\$434.00
Additional	\$217.00
b. Underground Tank Installations	
First tank	\$434.00
Additional	\$217.00
c. Underground Tank Piping (with new tank)	\$434.00
d. Underground Tank Piping Only (vapor recovery)	\$651.00
e. Underground Tank Removal	
First tank	\$434.00
Additional Tank	\$109.00 per additional tank
5. Compressed Gas Systems (exception: medical gas systems require a plumbing permit):	
a. Excess of quantities in IFC Table 105.6.9	\$434.00
6. High-Piled Storage:	
a. Class I – IV Commodities:	
501 – 2,500 square feet	\$434.00
2,501 – 12,000 square feet	\$651.00
Over 12,000 square feet	\$868.00
b. High Hazard Commodities:	
501 – 2,500 square feet	\$651.00
Over 2,501 square feet	\$1,085.00
7. Underground Fire Mains and Hydrants	\$651.00
8. Industrial Ovens:	
Class A or B Furnaces	\$434.00
Class C or D Furnaces	\$868.00
9. LPG (Propane) Tanks:	
Commercial, less than 500-Gallon Capacity	\$434.00
Commercial, 500-Gallon+ Capacity	\$651.00
Residential 0 – 500-Gallon Capacity	\$217.00
Spray Booth	\$868.00
10. Sprinkler Systems:	
a. New Systems	\$1,085.00 plus \$3.00 per head
b. Existing Systems	
1 – 10 heads - Over the Counter	\$217.00
11 – 20 heads - Over the Counter	\$434.00
More than 20 heads - Full Review	\$651.00 plus \$3.00 per head over 20 heads
c. Residential (R-3) 13-D System	
1 – 30 heads	\$651.00
More than 30 heads	\$651.00 plus \$3.00 per head
Voluntary 13-D Systems in residencies when not otherwise required	\$217.00
11. Standpipe Systems	\$868.00
12. Emergency Power Supply Systems:	
10 kW - 50 kW	\$651.00
> 50 kW	\$1,085.00
13. Temporary Tents and Canopies	\$217.00
14. Fire Review -Single-Family	\$109.00
15. Fire Review -Subdivision	Hourly rate, 1-hour minimum
16. Fire Review -Other	Hourly rate, 1-hour minimum
17. Emergency Responder Radio Coverage System	\$651.00

Planning and Community Development

Type of Permit Application	2022 Adopted
18. Smoke Control Systems - Mechanical or Passive	\$868.00
<b>D. MECHANICAL</b>	
1. Residential Mechanical System	\$217.00 (including 4 pieces of equipment), \$12.00 per piece of equipment over 4
2. Commercial Mechanical System	\$580.00 (including 4 pieces of equipment), \$12.00 per piece of equipment over 4
3. All Other Mechanical Plan Review (Residential and Commercial)	Hourly rate, 1-hour minimum
<b>E. PLUMBING</b>	
1. Plumbing System	\$217.00 (including 4 fixtures), \$12.00 per fixture over 4
2. Gas Piping System standalone permit	\$217.00 (including 4 outlets), \$12.00 per outlet over 4
3. Gas Piping as part of a plumbing or mechanical permit	\$12.00 per outlet (when included in outlet count)
4. Backflow Prevention Device - standalone permit	\$217.00 (including 4 devices), \$12.00 per devices over 4
5. Backflow Prevention Device as part of a plumbing systems permit	\$12.00 per device (when included in fixture count)
6. All Other Plumbing Plan Review (Residential and Commercial)	Hourly rate, 1-hour minimum
<b>F. ENVIRONMENTAL REVIEW</b>	
1. Single-Family SEPA Checklist	\$3,472.00
2. Multifamily/Commercial SEPA Checklist	\$5,208.00
3. Planned Action Determination	Hourly rate, 5-hour minimum
4. Environmental Impact Statement Review	\$9,033.00
<b>G. LAND USE</b>	
1. Accessory Dwelling Unit	\$928.00
2. Administrative Design Review	\$1,736.00
3. Adult Family Home	\$520.00
4. Comprehensive Plan Amendment – Site Specific (Note: may be combined with Rezone public hearing.)	\$19,096.00 , plus public hearing (\$4,123.00)
5. Conditional Use Permit (CUP)	\$8,107.00
6. Historic Landmark Review	\$434.00
7. Interpretation of Development Code	\$813.00
8. Master Development Plan	\$28,954.00 , plus public hearing (\$4,123.00)
9. Changes to a Master Development Plan	\$14,476.00 , plus public hearing (\$4,123.00)
10. Rezone	\$18,760.00 , plus public hearing (\$4,123.00)
11. SCTF Special Use Permit (SUP)	\$16,909.00 , plus public hearing (\$4,123.00)
12. Sign Permit - Building Mounted, Awning, Driveway Signs	\$464.00
13. Sign Permit - Monument/Pole Signs	\$928.00
14. Special Use Permit	\$16,909.00 , plus public hearing (\$4,123.00)
15. Street Vacation	\$11,929.00 , plus public hearing (\$4,123.00)
16. Temporary Use Permit (TUP) EXCEPT fee is waived as provided in SMC 20.30.295(D)(2) for Transitional Encampments and Emergency Temporary Shelters	\$1,736.00
17. Deviation from Engineering Standards	Hourly rate, 8-hour minimum
18. Variances - Zoning	\$9,844.00
19. Lot Line Adjustment	\$1,736.00
20. Lot Merger	\$434.00
21. Development Agreement	Hourly rate, 125-hour minimum , plus public hearing (\$4,123.00)
<b>H. CRITICAL AREAS FEES</b>	
1. Critical Area Field Signs	\$7.00 per sign
2. Critical Areas Review	Hourly rate, 2-hour minimum

**Planning and Community Development**

<b>Type of Permit Application</b>	<b>2022 Adopted</b>
3. Critical Areas Monitoring Inspections (Review of three reports and three inspections.)	\$2,085.00
4. Critical Areas Reasonable Use Permit (CARUP)	\$15,635.00 , plus public hearing (\$4,123.00)
5. Critical Areas Special Use Permit (CASUP)	\$15,635.00 , plus public hearing (\$4,123.00)
<b>I. MISCELLANEOUS FEES</b>	
1. Permit Fee for Work Commenced Without a Permit	Twice the Applicable Permit Fee
2. Expedited Review – Building or Site Development Permits	Twice the applicable permit review fee(s)
3. All Other Fees Per Hour	Hourly rate, 1-hour minimum
4. Multiple Family Tax Exemption Application Fee	Hourly rate, 3-hour minimum
5. Extension of the Conditional Certificate for the Multiple Family Tax Exemption Application Fee	\$217.00
6. Multiple Family Tax Exemption or Affordable Housing Annual Compliance Verification	\$434.00
7. Pre-application Meeting	\$510.00 Mandatory pre-application meeting \$217.00 Optional pre-application meeting
8. Transportation Impact Analysis (TIA) Review (less than 20 trips)	\$217.00
9. Transportation Impact Analysis (TIA) Review (20 or more trips)	Hourly rate, 1-hour minimum
10. Noise Variance	\$434.00
<b>J. RIGHT-OF-WAY</b>	
1. Right-of-Way Utility Blanket Permits	\$217.00
2. Right-of-Way Use Limited	Hourly rate, 1-hour minimum
3. Right-of-Way Use	Hourly rate, 3-hour minimum
4. Right-of-Way Use Full Utility Permit	Hourly rate, 4-hour minimum
5. Right-of-Way Site	Hourly rate, 4-hour minimum
6. Right-of-Way Special Events	\$1,085.00
7. Residential Parking Zone Permit	\$21.00
8. Right-of-Way Extension	Hourly rate, 1-hour minimum
<b>K. SHORELINE SUBSTANTIAL DEVELOPMENT</b>	
1. Shoreline Conditional Permit Use	\$8,338.00
2. Shoreline Exemption	\$544.00
3. Shoreline Variance	\$11,582.00 , plus public hearing (\$4,123.00)
Substantial Development Permit (based on valuation):	
4. up to \$10,000	\$2,895.00
5. \$10,000 to \$500,000	\$6,950.00
6. over \$500,000	\$11,582.00
<b>L. SITE DEVELOPMENT</b>	
1. Clearing and/or Grading Permit	Hourly rate, 3-hour minimum
2. Subdivision Construction	Hourly rate, 10-hour minimum
3. Multiple Buildings	Hourly rate, 10-hour minimum
4. Clearing and Grading Inspection - Sum of Cut and Fill Yardage:	
5. 50-500 CY without drainage conveyance	\$217.00
6. 50-500 CY with drainage conveyance	\$464.00
7. 501-5,000 CY	\$928.00
8. 5001-15,000 CY	\$1,853.00
9. More than 15,000 CY	\$4,866.00
10. Tree Removal	\$217.00
<b>M. SUBDIVISIONS</b>	
1. Binding Site Plan	\$6,601.00



Planning and Community Development

Type of Permit Application	2022 Adopted
2. Preliminary Short Subdivision	\$7,529.00 for two-lot short subdivision, plus (\$579.00) for each additional lot
3. Final Short Subdivision	\$2,201.00
4. Preliminary Subdivision	\$17,373.00 for ten-lot subdivision, plus \$813.00 for each additional lot and \$4,123.00 for public hearing
5. Final Subdivision	\$5,928.00
6. Changes to Preliminary Short or Formal Subdivision	\$4,286.00
7. Plat alteration	Hourly rate, 10-hour minimum
8. Plat alteration with public hearing	Hourly rate, 10-hour minimum , plus public hearing (\$4,123.00)
9. Vacation of subdivision	Hourly rate, 10-hour minimum , plus public hearing (\$4,123.00)

**Planning and Community Development**

Type of Permit Application	2022 Adopted
<b>N. SUPPLEMENTAL FEES</b>	
1. Supplemental permit fees	Additional review fees may be assessed if plan revisions are incomplete, corrections not completed, the original scope of the project has changed, or scale and complexity results in review hours exceeding the minimums identified in this schedule. Fees will be assessed at the fee established in SMC 3.01.010(A)(1), minimum of one hour.
2. Reinspection fees	\$289.00
	Reinspection fees may be assessed if work is incomplete and corrections not completed.
3. Additional Inspection fees	Additional inspection fees may be assessed for phased construction work or if more inspections are required than included in the permit fee. Fees will be assessed at the fee established in SMC 3.01.010(A)(1), minimum of one hour.
4. Investigation inspection	\$289.00
5. Consultant Services	Additional outside consultant services fee may be assessed if the scope of the permit application exceeds staff resources. Estimate of outside consultant services fees to be provided in advance for applicant agreement.
<b>O. FEE REFUNDS</b>	
<p>The city manager or designee may authorize the refunding of:</p> <ol style="list-style-type: none"> <li>One hundred percent of any fee erroneously paid or collected.</li> <li>Up to 80 percent of the permit fee paid when no work has been done under a permit issued in accordance with this code.</li> <li>Up to 80 percent of the plan review fee paid when an application for a permit for which a plan review fee has been paid is withdrawn or canceled and minimal plan review work has been done.</li> <li>The city manager or designee shall not authorize refunding of any fee paid except on written application filed by the original permittee not later than 180 days after the date of fee payment.</li> </ol>	
<b>P. FEE WAIVER</b>	
<ol style="list-style-type: none"> <li>The City Manager or designee may authorize the waiver of the double fee for work commenced without a permit for property owners not responsible for initiating the work without a permit. Any fee waiver request must be submitted in writing by the current property owner prior to permit issuance and detail the unpermitted work related to the dates of property ownership.</li> </ol>	
<b>Q. IMPACT FEE ADMINISTRATIVE FEES</b>	
1. Administrative Fee - All applicable projects per building permit application	Hourly rate, 1-hour minimum
2. Administrative Fee - Impact fee estimate/preliminary determination for	Hourly rate, 1-hour minimum
3. Administrative Fee - Independent fee calculation per impact fee type	Hourly rate, 1-hour minimum
4. Administrative Fee - Deferral program	Hourly rate, 1-hour minimum
All administrative fees are nonrefundable.	
Administrative fees shall not be credited against the impact fee.	
Administrative fees applicable to all projects shall be paid at the time of building permit issuance.	
Administrative fees for impact fee estimates or preliminary determination shall be paid at the time the request is submitted to the city.	
Administrative fees for independent fee calculations shall be paid prior to issuance of the director's determination, or for fire impact fees, the fire chief's determination.	

**City of Shoreline  
Fee Schedules**

**Fire - Operational**

Type of Permit Application	2022 Adopted
<b>A. FIRE - OPERATIONAL</b>	
1. Aerosol Products	\$217.00
2. Amusement Buildings	\$217.00
3. Carnivals and Fairs	\$217.00
4. Combustible Dust-Producing Operations	\$217.00
5. Combustible Fibers	\$217.00
6. Compressed Gases	\$217.00
7. Cryogenic Fluids	\$217.00
8. Cutting and Welding	\$217.00
9. Dry Cleaning (hazardous solvent)	\$217.00
10. Flammable/Combustible Liquid Storage/Handle/Use	\$217.00
11. Flammable/Combustible Liquid Storage/Handle/Use - (add'l specs)	Add'l fee based on site specs
12. Floor Finishing	\$217.00
13. Garages, Repair or Servicing - 1 to 5 Bays	\$217.00
14. Garages, Repair or Servicing - (add'l 5 Bays)	\$109.00
15. Hazardous Materials	\$650.00
16. Hazardous Materials (including Battery Systems 55 gal>)	\$217.00
17. High-Piled Storage	\$217.00
18. Hot Work Operations	\$217.00
19. Indoor Fueled Vehicles	\$217.00
20. Industrial Ovens	\$217.00
21. LP Gas-Consumer Cylinder Exchange	\$109.00
22. LP Gas-Retail Sale of 2.5 lb or less	\$109.00
23. LP Gas-Commercial Containers (Tanks)	\$217.00
24. LP Gas-Commercial Containers, Temporary (Tanks)	\$217.00
25. Lumber Yard	\$217.00
26. Misc Comb Material	\$217.00
27. Open Flames and Candles	\$217.00
28. Open Flames and Torches	\$217.00
29. Places of Assembly 50 to 100	\$109.00
30. Places of Assembly up to 500	\$217.00
31. Places of Assembly 501>	\$434.00
32. Places of Assembly (add'l assembly areas)	\$109.00
33. Places of Assembly - A-5 Outdoor	\$109.00
34. Places of Assembly - Outdoor Pools	\$109.00
35. Places of Assembly - Open Air Stadiums	\$217.00
36. Pyrotechnic Special Effects Material	\$217.00
37. Pyrotechnic Special Effects Material (add'l specs)	Add'l fee based on site specs
38. Refrigeration Equipment	\$217.00
39. Scrap Tire Storage	\$217.00
40. Spraying or Dipping	\$217.00
41. Waste Handling	\$217.00
42. Wood Products	\$217.00

**City of Shoreline  
Fee Schedules**

**Affordable Housing Fee In-Lieu**

<b>2022 Adopted</b>		
<b>A. Rate Table</b>		
<b>Zoning District</b>	<b>Fee per unit if providing 10% of total units as affordable</b>	<b>Fee per unit if providing 20% of total units as affordable</b>
MUR-45	\$212,755.00	\$163,523.00
MUR-70	\$212,755.00	\$163,523.00
MUR-70 with development agreement	\$261,986.00	\$212,755.00
Note: The Fee In-Lieu is calculated by multiplying the fee shown in the table by the fractional mandated unit. For example, a 0.40 fractional unit multiplied by \$212,755 would result in a Fee In-Lieu of \$85,102.		

**City of Shoreline  
Fee Schedules**

**Animal Licensing and Service Fees**

Annual License	2022 Adopted
<b>A. PET - DOG OR CAT</b>	
1. Unaltered	\$60.00
2. Altered	\$30.00
3. Juvenile pet	\$15.00
4. Discounted pet	\$15.00
5. Replacement tag	\$5.00
6. Transfer fee	\$3.00
7. License renewal late fee – received 45 to 90 days following license expiration	\$15.00
8. License renewal late fee – received 91 to 135 days following license expiration	\$20.00
9. License renewal late fee – received more than 136 days following license expiration	\$30.00
10. License renewal late fee – received more than 365 days following license expiration	\$30.00 plus license fee(s) for any year(s) that the pet was unlicensed
<i>Service Animal Dogs and Cats and K-9 Police Dogs: Service animal dogs and cats and K-9 police dogs must be licensed, but there is no charge for the license.</i>	
<b>B. GUARD DOG</b>	
1. Guard dog registration	\$100.00
<b>C. ANIMAL RELATED BUSINESS</b>	
1. Hobby kennel and hobby cattery	\$50.00
2. Guard dog trainer	\$50.00
3. Guard dog purveyor	\$250.00
<b>D. GUARD DOG PURVEYOR</b>	
1. If the guard dog purveyor is in possession of a valid animal shelter, kennel or pet shop license, the fee for the guard dog purveyor license shall be reduced by the amount of the animal shelter, kennel or pet shop license.	
<b>E. FEE WAIVER</b>	
1. The director of the animal care and control authority may waive or provide periods of amnesty for payment of outstanding licensing fees and late licensing penalty fees, in whole or in part, when to do so would further the goals of the animal care and control authority and be in the public interest. In determining whether a waiver should apply, the director of the animal care and control authority must take into consideration the total amount of the fees charged as compared with the gravity of the violation and the effect on the owner, the animal's welfare and the animal care and control authority if the fee or fees or penalties are not waived and no payment is received.	

## City of Shoreline Fee Schedules

### Business License Fees

License	2022 Adopted	
<b>A. BUSINESS LICENSE FEES - GENERAL</b>		
1. Business license registration fee for new application filed for business beginning between January 1 and June 30	\$40.00	
2. Business license registration fee for new application filed for business beginning between July 1 and December 31	\$20.00	
The annual business license fee for new applications is prorated as necessary to conform to SMC 5.05.060.		
3. Annual business license renewal fee due January 31	\$40.00	
a. Penalty schedule for late annual business license renewal as described in SMC 5.05.080 received on or after:		
i. February 1	\$10.00	
ii. March 1	\$15.00	
iii. April 1	\$20.00	
<b>B. REGULATORY LICENSE FEES</b>		
1. Regulated massage business	\$238.00 Per Year	
2. Massage manager	\$52.00 Per Year	
Plus additional \$11 fee for background checks for regulated massage business or massage manager		
3. Public dance	\$163.00 Per Dance	
4. Pawnbroker	\$763.00 Per Year	
5. Secondhand Dealer	\$74.00 Per Year	
6. Master solicitor	\$149.00 Per Year	
7. Solicitor	\$37.00 Per Year	
Late fees for the above regulatory licenses: A late penalty shall be charged on all applications for renewal of a regulatory license received later than 10 working days after the expiration date of such license. The amount of such penalty is fixed as follows: * For a license requiring a fee of less than \$50.00, two percent of the required fee. * For a license requiring a fee of more than \$50.00, ten percent of the required fee.		
8. Adult cabaret operator	\$763.00 Per Year	
9. Adult cabaret manager	\$163.00 Per Year	
10. Adult cabaret entertainer	\$163.00 Per Year	
11. Panoram Operator	\$761.00 Per Year	
Plus additional \$58 fee for fingerprint background checks for each operator:		
12. Panoram premise	\$313.00 Per Year	
13. Panoram device	\$90.00 Per Year Per Device	
Penalty schedule for Adult cabaret and Panoram licenses:		
Days Past Due		
7 - 30	10%	of Regulatory License Fee
31 - 60	25%	of Regulatory License Fee
61 and over	100%	of Regulatory License Fee
14. Duplicate Regulatory License	\$6.00	

## City of Shoreline Fee Schedules

### Filmmaking Permit Fees

		2022 Adopted
<b>A. PERMIT FEES</b>		
1. Low Impact Film Production		\$25.00 flat fee per production (for up to 14 consecutive days of filming)
2. Low Impact Daily Rate (each additional day after 14 days)		\$25.00 per additional day
3. Moderate Impact Film Production		\$25.00 per day
4. High Impact Film Production		Applicable permit fees apply, including but not limited to, permits for the right-of-way and park rental fees.
<b>B. FEE WAIVER</b>		
The city manager may consider a waiver for any fees that may apply under this section. Any fee waiver request must be submitted concurrently with the filmmaking permit application.		
<b>C. ADDITIONAL COSTS</b>		
Any additional costs incurred by the city, related to the filmmaking permitted activity, shall be paid by the applicant. The applicant shall comply with all additional cost requirements contained in the Shoreline Film Manual.		

**City of Shoreline  
Fee Schedules**

**Hearing Examiner Fees**

	<b>2022 Adopted</b>
<b>A. HEARING EXAMINER APPEAL HEARING FEE</b>	\$580.00



## City of Shoreline Fee Schedules

### Public Records

		2022 Adopted	
1. Photocopying paper records			
a. Black and white photocopies of paper up to 11 by 17 inches - if more than five pages	\$0.15	Per Page	
b. Black and white photocopies of paper larger than 11 by 17 inches - City Produced	\$5.00	First Page	
	\$1.50	Each additional page	
c. Color photocopies up to 11 by 17 inches - if more than three pages	\$0.25	Per Page	
2. Scanning paper records			
a. Scans of paper up to 11 by 17 inches - if more than five pages	\$0.15	Per Page	
3. Copying electronic records			
a. Copies of electronic records to file sharing site - if more than five pages (2 minute minimum)	\$0.91	Per Minute	
b. Copies of electronic records onto other storage media	Cost incurred by City for hardware plus \$0.91/minute		
4. Other fees			
a. Photocopies - vendor produced	Cost charged by vendor, depending on size and process		
b. Convert electronic records (in native format) into PDF format – if more than 15 minutes	\$50.00	Per hour	
c. Service charge to prepare data compilations or provide customized electronic access services	Actual staff cost		
d. Photographic prints and slides	Cost charged by vendor, depending on size and process		
e. Clerk certification	\$1.50	Per document	
5. Geographic Information Systems (GIS) services			
a. GIS maps smaller than 11 by 17 inches	\$0.50	Per Page	
b. GIS maps larger than 11 by 17 inches	\$1.70	Per Square Foot	
c. Custom GIS Mapping and Data Requests	\$107.00	Per Hour (1 Hour Minimum)	

**City of Shoreline  
Fee Schedules  
Parks, Recreation and Community Services**

Fee	2022 Adopted Resident Rate	2022 Adopted Non-Resident Rate
<b>A. OUTDOOR RENTAL FEES</b>		
1. Picnic Shelters – (same for all groups)		
a. Half Day (9:00am-2:00pm or 2:30pm-Dusk)	\$76	\$97
b. Full Day (9:00am - Dusk)	\$111	\$139
2. Cromwell Park Amphitheater & Richmond Beach Terrace		
a. Half Day	\$76	\$97
b. Full Day	\$111	\$139
3. Alcohol Use		
a. Special Alcohol Permit Fee (in addition to shelter rental)	\$200	\$250
4. Athletic Fields (Per Hour)		
a. Lights (determined by dusk schedule; hourly rate includes \$5 Capital Improvement Fee)	\$25	\$25
b. Non-Profit Youth Organization	\$7	\$10
c. For-Profit Youth Organization	\$19	\$23
d. All Other Organizations/Groups	\$19	\$23
e. Baseball Field Game Prep	\$29	\$39
5. Synthetic Fields (Per Hour; 50% proration for half field use)		
a. Non-Profit Youth Organizations	\$21	\$30
b. For-Profit Youth Organization	\$32	\$42
c. All Other Organizations/Groups	\$72	\$88
d. Discount Field Rate **	\$21	\$30
**Offered during hours of low usage as established and posted by staff		
6. Tennis Courts		
a. Per hour	\$8	\$10
7. Park and Open Space Non-Exclusive Area		
a. Event Permit Hourly Fee *	\$17	\$20
b. Concession Sales Hourly Fee**	\$3	\$4
* Event Permit fees waived for sanctioned Neighborhood events. **Concession Sales Hourly fee waived for youth non-profit organizations and sanctioned neighborhood events		
8. Community Garden Plot Annual Rental Fee		
a. Standard Plot	\$46	N/A
b. Accessible Plot	\$23	N/A
9. Amplification Supervisor Fee		
a. Per hour; when applicable	\$28	\$28
10. Attendance Fee		
a. 101+ Attendance	\$56	\$56

**City of Shoreline**  
**Fee Schedules**  
**Parks, Recreation and Community Services**

Fee	2022 Adopted Resident Rate	2022 Adopted Non-Resident Rate
<b>B. INDOOR RENTAL FEES</b>		
	Per Hour (2 Hour Minimum)	Per Hour (2 Hour Minimum)
1. Richmond Highlands (same for all groups) Maximum Attendance 214		
a. Entire Building (including building monitor)	\$67	\$81
2. Spartan Recreation Center Fees for Non-Profit Youth Organizations/Groups		
a. Multi-Purpose Room 1 or 2	\$14	\$19
b. Multi-Purpose Room 1 or 2 w/Kitchen	\$23	\$29
c. Gymnastics Room	\$14	\$19
d. Dance Room	\$14	\$19
e. Gym-One Court	\$23	\$29
f. Entire Gym	\$41	\$52
g. Entire Facility	\$110	\$139
3. Spartan Recreation Center Fees for All Other Organizations/Groups		
a. Multi-Purpose Room 1 or 2	\$28	\$34
b. Multi-Purpose Room 1 or 2 w/Kitchen	\$39	\$47
c. Gymnastics Room	\$28	\$34
d. Dance Room	\$28	\$34
e. Gym-One Court	\$39	\$47
f. Entire Gym	\$74	\$89
g. Entire Facility	\$145	\$174
As a health and wellness benefit for regular City employees, daily drop-in fees for regular City employees shall be waived.		
* Rentals outside the normal operating hours of the Spartan Gym may require an additional supervision fee. (See Below)		
4. City Hall Rental Fees		
a. City Hall Rental - Third Floor Conference Room	\$41 Per Hour	\$49 Per Hour
b. City Hall Rental - Council Chambers	\$117 Per Hour	\$139 Per Hour
c. AV Set-up Fee - Per Room	\$17	\$17
5. Other Indoor Rental Fees:		
a-1. Security Deposit (1-125 people): (refundable)	\$200	\$200
a-2. Security Deposit (126+ people): (refundable)	\$400	\$400
b. Supervision Fee (if applicable)	\$21/hour	\$21/hour
c. Daily Rates (shall not exceed)	\$984	\$1,181

**City of Shoreline  
Fee Schedules**

**Parks, Recreation and Community Services**

Fee	2022 Adopted Resident Rate	2022 Adopted Non-Resident Rate
<b>C. CONCESSIONAIRE PERMIT FEES</b>		
1. Concession Permit (requires additional hourly fee)	\$56	\$67
<p>Concession Permit fees and additional Concession Fees are exempt for Non-Profit Youth Organizations, and sanctioned Neighborhood Association Events. Sanctioned Neighborhood Associations Events are exempt from all rental fees with the exception of associated supervision fees when applicable. Concession/Admission/Sales Fees may be modified at the discretion of the RCCS Director.</p>		
<b>D. INDOOR DROP-IN FEES</b>		
1. Showers Only (Spartan Recreation Center)	\$1	\$1
2. Drop-In		
a. Adult	\$3	\$4
b. Senior/Disabled	\$2	\$3
3. 1 Month Pass		
a. Adult	\$28	\$35
b. Senior/Disabled	\$19	\$24
4. 3 Month Pass		
a. Adult	\$69	\$81
b. Senior/Disabled	\$49	\$57
Senior is 60+ years of age		
<b>E. GENERAL RECREATION PROGRAM FEES</b>		
General Recreation Program Fees are based upon Recreation and Community Services' Cost Recovery/Fee Setting Framework.		
<b>F. FEE IN LIEU OF STREET TREE REPLACEMENT</b>	\$2,779	N/A
<b>G. FEE REFUNDS</b>		
Whenever a fee is paid for the use of parks or recreation facilities or property or for participation in a Recreation and Community Services Department sponsored class or program, and a refund request is made to the city, fees may be refunded according to the Recreation and Community Services Department's Refund Policy and Procedures.		
<b>H. RECREATION SCHOLARSHIPS</b>		
Scholarships for the fee due to the participate in a Recreation and Community Services Department sponsored class or program may be awarded when a request is made to the city according to the Recreation and Community Services Department's Recreation Scholarship Policy and Procedures.		

**City of Shoreline  
Fee Schedules**

**Surface Water Management Rate Table**

Rate Category	Percent Hard Surface	2022 Proposed SWM Annual Fee			
		2022 SWM Annual Fee	Effective Utility Tax	Per Unit	Fee + Utility Tax
<b>A. Rate Table</b>					
1. Residential: Single-family home		\$295.51	\$17.73	Per Parcel	\$313.24
2. Very Light	Less than or equal to 10%	\$295.51	\$17.73	Per Parcel	\$313.24
3. Light	More than 10%, less than or equal to 20%	\$686.34	\$41.18	Per Acre	\$727.52
4. Moderate	More than 20%, less than or equal to 45%	\$1,417.89	\$85.07	Per Acre	\$1,502.96
5. Moderately Heavy	More than 45%, less than or equal to 65%	\$2,749.97	\$165.00	Per Acre	\$2,914.97
6. Heavy	More than 65%, less than or equal to 85%	\$3,483.95	\$209.04	Per Acre	\$3,692.99
7. Very Heavy	More than 85%, less than or equal to 100%	\$4,563.45	\$273.81	Per Acre	\$4,837.26
Minimum Rate		\$295.51	\$17.73		\$313.24
<p>There are two types of service charges: The flat rate and the sliding rate. The flat rate service charge applies to single family homes and parcels with less than 10% hard surface. The sliding rate service charge applies to all other properties in the service area. The sliding rate is calculated by measuring the amount of hard surface on each parcel and multiplying the appropriate rate by total acreage.</p>					
<b>B. CREDITS</b>					
Several special rate categories will automatically be assigned to those who qualify					
1. An exemption for any home owned and occupied by a low income senior citizen determined by the assessor to qualify under RCW 84.36.381.					
2. A public school district shall be eligible for a waiver of up to 100% of its standard rates based on providing curriculum which benefits surface water utility programs. The waiver shall be provided in accordance with the Surface Water Management Educational Fee Waiver procedure.					
3. Alternative Mobile Home Park Charge. Mobile Home Park Assessment can be the lower of the appropriate rate category or the number of mobile home spaces multiplied by the single-family residential rate.					
4. New or remodeled commercial buildings utilizing a permissive rainwater harvesting system, properly sized to utilize the available roof surface of the building, are eligible for a 10 percent reduction in total Surface Water Management Fee, as per RCW 35.67.020(3). The City will consider rate reductions in excess of 10 percent dependent upon the amount of rainwater harvested.					
<b>C. RATE ADJUSTMENTS</b>					
Any person receiving a bill may file a request for a rate adjustment within two years of the billing date. (Filing a request will not extend the payment period). Property owners should file a request for a change in the rate assessed if:					
1. The property acreage is incorrect;					
2. The measured hard surface is incorrect;					
3. The property is charged a sliding fee when the fee should be flat;					
4. The person or property qualifies for an exemption or discount; or					
5. The property is wholly or in part outside the service area.					
<b>D. REBATE</b>					
Developed properties shall be eligible for the rebate under SMC 13.10.120 for constructing approved rain gardens or conservation landscaping at a rate of \$2.50 per square foot not to exceed \$2,000 for any parcel.					

**RATE SCHEDULE - Wastewater Utility**

	<b>Type of Permit Application/Fee</b>	<b>2022 Adopted</b>
<b>A. Side Sewers - Permits and Applications</b>		
<b>Single Family:</b>		
	New Connection	\$315.33
	Repairs or Replacement of Existing Side Sewers	\$157.67
	Capping-Off of Side Sewer	\$157.67
	Renewal	\$26.28
	No Notification Penalty Fee	\$157.67
	Single-Family Pump	\$315.33
<b>Multi-Family Residence:</b>		
	First Connection	\$315.33
	Each Additional Connection per Building	\$105.11
	Repairs or Replacement of Existing Side Sewers	\$157.67
	Capping-Off of Side Sewer	\$157.67
	Renewal	\$26.28
	No Notification Penalty Fee	\$157.67
<b>Commercial Building:</b>		
	One Business Entity, First Connection	\$315.33
	Each Additional Connection per Building	\$105.11
	Each Surfaced Clean-Out	\$52.56
	Repairs or Replacement of Existing Side Sewers	\$157.67
	Capping-Off of Side Sewer	\$157.67
	Renewal	\$26.28
<b>B. Rework Main/Grafting Saddle</b>		\$315.33
<b>C. Surcharges</b>		
	Industrial Waste Surcharge	See Section G
	Additional surcharges may be imposed on any account type or area based on the additional cost of serving those properties beyond costs generally incurred for properties served by the public wastewater system	Actual surcharge determined pursuant to Section 7 of the Wastewater Revenue and Customer Service Policy, City Policy# 200-F-09
	Additional Inspection (1) during normal working hours	\$78.83
	Overtime Inspection other than normal working hours	\$420.44

<b>D. Flushing Permit</b>		
	Flushing not to exceed 20,000 gallons or 2,674 cubic feet of water	\$210.22 (Includes City Fee \$157.67 + Treatment Charge \$52.56)
	Flushing not to exceed 50,000 gallons or 6,684 cubic feet of water	\$299.57 (Includes City Fee \$157.67 + Treatment Charge \$11.90)

**E. Special Permits**

The Public Works Director shall have the authority to establish a minimum deposit of \$500.00 for those installations not covered in the permit fee schedule. The inspection fees and other pertinent costs are to accrue against this deposit. The owner will receive either a refund or billing for additional charges within sixty (60) days from approval of the installation.

<b>F. Review Fees</b>		
	Certificate of Sewer Availability	\$157.67
	Single-Family Pump	\$367.89
	Developer Extension Application	\$788.33
	Developer Extension Application for a Pump Station (Additional Fee)	\$788.33
	Developer Extension	Actual Costs Incurred by City for Outside Consultants Plus 15% for City Administrative Costs
	Apartment/Multi-Family Plan Review	\$367.89

<b>G. Industrial Discharge Permit</b>		
	Permit Issuance Fee	\$210.22
	Industrial Waste Surcharge	As Determined by King County
	Monthly Inspection, Monitoring and Treatment Fee	\$157.67
	No Notification Penalty Fee	\$157.67

<b>H. Sewer Service Charges*</b>			
<b>Per Month, Billed Bi-Monthly Residential:</b>		<b>2022 Adopted</b>	
1 - Single Family Thru Four Plex	City	\$17.48	Per Unit
	Treatment - Edmonds	\$30.35	Per Unit
	Total	\$47.83	Per Unit
1S - Single Family Thru Four Plex; Low Income Senior/Disabled Citizen Discount	City	\$8.75	Per Unit
	Treatment - Edmonds	\$15.17	Per Unit
	Total	\$23.91	Per Unit
2 - Single Family Thru Four Plex	City	\$17.48	Per Unit
	Treatment - King County	\$49.79	Per Unit

Attachment A Exhibit A

	Total	\$67.27	Per Unit
2S - Single Family Thru Four Plex; Low Income Senior/Disabled Citizen Discount	City	\$8.75	Per Unit
	Treatment - King County	\$24.89	Per Unit
	Total	\$33.64	Per Unit
3 - Single Family Thru Four Plex; ATL, No Pump on Property	City	\$88.46	Per Unit
	Treatment - King County	\$49.79	Per Unit
	Total	\$138.22	Per Unit
4 - Single Family Thru Four Plex; ATL, \$1.00 Credit - Single Pump	City	\$87.41	Per Unit
	Treatment - King County	\$49.79	Per Unit
	Total	\$137.17	Per Unit
5 - Single Family Thru Four Plex; ATL \$2.00 Credit - Pump Serves 2 Properties	City	\$86.36	Per Unit
	Treatment - King County	\$49.79	Per Unit
	Total	\$136.12	Per Unit
<b>Per Month, Billed Monthly Residential:</b>			
6 - Single Family Thru Four Plex	City	\$17.48	Per Unit
	Treatment - King County	\$49.79	Per Unit
	Total	\$67.27	Per Unit
6S- Single Family Thru Four Plex; Low Income Senior/Disabled Citizen Discount	City	\$8.75	Per Unit
	Treatment - King County	\$24.89	Per Unit
	Total	\$33.64	Per Unit
<b>Monthly Commercial:</b>			
100 - Misc. Business, School, Apts, Condos, Hotels, Motels, Trailer/Mobile Home Parks, Industrial	City	\$17.48 Per Unit or RCE; Whichever is Higher	
	Treatment - Edmonds	\$30.35 RCE (1 RCE Min)	
	Treatment - King County	\$49.79 RCE (1 RCE Min)	
200 - Misc. Business, School, Apts, Condos, Hotels, Motels, Trailer/Mobile Home Parks, Industrial	City	\$17.48 Per Unit or RCE; Whichever is Higher	
	Treatment - Edmonds	\$30.35 RCE (1 RCE Min)	
	Treatment - King County	\$49.79 RCE (1 RCE Min)	



<b>Monthly Special Billings:</b>		<b>2022 Adopted</b>
300 - Trailer/Mobile Home Parks & Apt	City and Treatment Combined	\$58.54 (50% of City Charge Plus 100% King County Treatment Charge); Billing-RCE
	City and Treatment Combined	\$58.54 (50% of City Charge Plus 100% King County Treatment Charge); Billing-MLT Provides Unit Count
<b>J. General Facility Charge (GFC)</b>		
Uniform GFC (all development)		\$3,165.94 per RCE
Commercial-Based Upon Fixture Count Calculation		King County Wastewater Treatment Division Formula
<b>K. Treatment Facilities Charge</b>		
Edmonds Treatment Facilities Charge		\$2,633.03 per RCE
<b>L. Local Facility Charge</b>		\$30,574.99
<b>M. Administrative Fees</b>		
Account Set Up, Owner, or Tenant Change		\$10.51
Duplicate Billing Fee		\$2.10
Escrow Closing Request		\$26.28
Lien		\$225.99
Late Charge		10%
Refund Request Fee		\$10.51
<p><i>6% Utility Tax is included in the service charges and permitting fees. It is not applicable to capital charges, such as General Facility, Treatment Facility and Local Facility Charges.</i></p>		

**City of Shoreline  
Fee Schedules**

**Fee Waiver**

The city manager or designee is authorized to waive the following fees as a city contribution toward events which serve the community and are consistent with adopted city programs:

- A. Right-of-way permits (See Planning and Community Development).
- B. Facility use and meeting room fees (See Parks, Recreation and Community Services).
- C. Concessionaire permits (See Parks, Recreation and Community Services).
- D. The city manager is authorized to designate collection points in the City Hall lobby, Shoreline Pool, or Spartan Recreation Center for any charitable organization without charge to be used for the donation of food or goods that will benefit Shoreline residents in need.

[Res. 471 § 1 (Exh. A), 2021; Ord. 920 § 1, 2021; Ord. 903 § 3 (Exh. A), 2020; Ord. 872 § 3 (Exh. A), 2019; Ord. 841 § 3 (Exh. A), 2018; Ord. 806 § 3 (Exh. A), 2017; Ord. 779 § 1, 2017; Ord. 758 § 3 (Exh. A), 2016; Ord. 704 § 1, 2015; Ord. 678 § 1, 2013 (Exh. A); Ord. 650 § 3 (Exh. A), 2012; Ord. 602 § 2, 2011; Ord. 570 § 2, 2010; Ord. 243 § 1, 2000]

**Damage Restitution Administrative Fee**

	2022 Adopted
An administrative fee to cover a portion of the cost of collecting information and processing damage restitution invoices. This fee shall be added to the amount of calculated restitution necessary to repair, replace or restore damage to City property when invoiced. The administrative fee may be reduced or waived as provided	\$53

[Res. 471 § 1 (Exh. A), 2021; Ord. 920 § 1, 2021; Ord. 903 § 3 (Exh. A), 2020]

**Collection Fees (Financial)**

	2022 Adopted
The maker of any check that is returned to the city due to insufficient funds or a closed account shall be assessed a collection fee	\$36.00

[Res. 471 § 1 (Exh. A), 2021; Ord. 920 § 1, 2021; Ord. 903 § 3 (Exh. A), 2020; Ord. 872 § 3 (Exh. A), 2019; Ord. 841 § 3 (Exh. A), 2018; Ord. 806 § 3 (Exh. A), 2017; Ord. 758 § 3 (Exh. A), 2016; Ord. 728 § 3 (Exh. A), 2015; Ord. 704 § 1, 2015; Ord. 678 § 1, 2013 (Exh. A); Ord. 650 § 3 (Exh. A), 2012; Ord. 622 § 3 (Exh. A), 2011; Ord. 585 § 3(b) (Exh. B), 2010; Ord. 528 § 3 (Exh. A), 2008; Ord. 486 § 3, 2007; Ord. 451 §§ 5, 14, 2006; Ord. 315, 2002; Ord. 294 § 1, 2001; Ord. 285 § 1, 2001. Formerly 3.01.040.]

**Annual Adjustments**

Increases of the fees contained in the fee schedules in this chapter shall be calculated on an annual basis by January 1st of each year by the average for the period that includes the last six months of the previous budget year and the first six months of the current budget year of the Seattle-Tacoma-Bellevue Consumer Price Index for all urban consumers (CPI-U), unless the Shoreline Municipal Code calls for the use of another index / other indices, the fee is set by another agency, or specific circumstances apply to the calculation of the fee. The appropriate adjustment shall be calculated each year and included in the city manager's proposed budget. The city manager may choose to not include the calculated adjustments in the city manager's proposed budget and the city council may choose to not include the calculated adjustments in the adopted budget for select user fees in any individual budget year without impacting the full force of this section for subsequent budget years. The annual adjustments to the fees in this chapter shall be rounded as appropriate to ensure efficient administration of fee collection.

**CITY COUNCIL AGENDA ITEM**  
CITY OF SHORELINE, WASHINGTON

<b>AGENDA TITLE:</b>	Discussion of Ordinance No. 948 – Amending Chapter 15.05, Construction and Building Codes, of the Shoreline Municipal Code, to Provide Amendments to the Washington State Energy Code - Commercial, as Adopted by the State of Washington
<b>DEPARTMENT:</b>	Planning and Community Development
<b>PRESENTED BY:</b>	C. Ray Allshouse, Building Official
<b>ACTION:</b>	<input type="checkbox"/> Ordinance <input type="checkbox"/> Resolution <input type="checkbox"/> Motion <input checked="" type="checkbox"/> Discussion <input type="checkbox"/> Public Hearing

**PROBLEM/ISSUE STATEMENT:**

The City’s 2019 communitywide greenhouse gas emissions inventory showed a 1.3% increase in emissions compared to 2009. This trend is not on track to meet the City’s goals to reduce emissions by 25% by 2020, 50% by 2030, and 80% by 2050, as compared to 2009. Fossil fuels used in the built environment were responsible for approximately 30% of communitywide emissions in 2019, with 28% from natural gas and 2% from heating oil.

Increasing concerns about the environmental and public health impacts of fossil fuels used in buildings have led some municipalities to ban fossil fuel hookups in new construction. The City Council discussed this topic on August 16, 2021 and indicated general support for an ordinance to limit the use of fossil fuels for commercial construction and multi-family projects over three stories in height since Washington State prohibits local governments from passing electrification ordinances for new residential construction.

To this end, the Council discussed incorporating similar language used in the City of Seattle’s 2018 Energy Code Update, which began as the Regional Code Collaboration Suggested Commercial Energy Code Amendments, regarding the ban of the use of fossil fuels in new commercial and large multi-family construction projects for space heating and most water heating. This would be included under Shoreline Municipal Code (SMC) Title 15 – local amendments to the State Construction Codes, specifically amending the State Energy Code Commercial Provisions. This approach provides consistency for builders operating in Seattle, Shoreline and King County and yields regional emission reduction benefits. Adoption of these Washington State Commercial Energy Code Amendments also provides for other amendments in the commercial Energy Code in SMC Title 15.

Tonight, the City Council will consider proposed Ordinance No. 948 (Attachment A), which would amend SMC Title 15 by adding a new section to the SMC – 15.05.090 - that provides local amendments to the State Energy Code Commercial Provisions. Potential Council action on proposed Ordinance No. 948 is currently scheduled for December 6, 2021.

**RESOURCE/FINANCIAL IMPACT:**

There is no direct financial impact to this proposed action, other than City staff time being required to implement the proposed changes to SMC Title 15 and provide outreach to local builders.

**RECOMMENDATION**

This is a discussion item only; no action is required tonight. Based on feedback from the Council discussion on August 16, 2021, staff recommends that the Council further discuss the Regional Code Collaboration Suggested Commercial Energy Code Amendments and provide staff feedback on proposed Ordinance No. 948 for Council consideration that aligns with these amendments. Council action on proposed Ordinance No. 948 is currently scheduled for December 6, 2021.

Approved By:           City Manager **DT**   City Attorney **MK**

## **BACKGROUND**

The City of Shoreline's 2019 communitywide greenhouse gas emissions inventory showed a 1.3% increase in emissions compared to 2009. This trend is not on track to meet the City's goals to reduce emissions by 25% by 2020, 50% by 2030, and 80% by 2050, as compared to 2009. Working to reduce emissions is critical to preventing the most catastrophic impacts of climate change for the community. The more quickly emissions are reduced, the more quickly climate change impacts are mitigated.

The Puget Sound region is already experiencing the impacts of a changing climate and is likely to see more extreme weather due to climate change, including extreme heat, wildfires, rising sea levels, and more-frequent flooding, all of which can harm public health. Direct effects, such as breathing problems from long exposure to wildfire smoke and heat-related illness from lasting heat waves, are already being seen. The communities in Shoreline that are most likely to be harmed by climate change include people of color, immigrants, and/or refugees; people with low incomes; and those who are experiencing homelessness. These communities are also the least likely to have resources to respond to climate change.

In Shoreline, buildings are largely heated by three fuel sources: electricity from Seattle City Light, natural gas from Puget Sound Energy, and heating oil from private companies. Electricity from Seattle City Light is considered carbon neutral and thus is the preferred energy source from both a carbon emissions reduction and public health perspective.

The City Council discussed this topic on August 16, 2021 and indicated general support for an ordinance to limit the use of fossil fuels for commercial construction and multi-family projects over three stories in height. The staff report from the August 16, 2021 Council discussion can be found at the following link:

<http://cosweb.ci.shoreline.wa.us/uploads/attachments/cck/council/staffreports/2021/staffreport081621-8a.pdf>.

### **City of Seattle Fossil Fuel Ban**

In December 2020, the City of Seattle announced that they would ban the use of fossil fuels in new commercial and large multi-family construction for space heating and most water heating. The Seattle Energy Code update includes the following key changes for commercial and large multifamily buildings:

- Eliminates all gas and most electric resistance space heating systems;
- Eliminates gas water heating in large multifamily buildings and hotels;
- Improves building exteriors to improve energy efficiency and comfort;
- Creates more opportunities for solar power; and
- Requires electrical infrastructure necessary for future conversion of any gas appliances in multifamily buildings.

## **2018 State Energy Code**

The 2018 Washington State Energy Code (WSEC), which went into effect on February 1, 2021, includes elements that continue to work towards a 70% reduction in net annual energy consumption in newly constructed residential and nonresidential buildings by 2031, compared to the 2006 WSEC. The 2018 WSEC includes a few elements that support increased electrification of building energy systems, including the following:

- New energy modeling protocol based on source carbon emissions savings instead of site energy savings for the proposed building in comparison to the baseline building (commercial code);
- Carbon emissions factors for each fuel source (commercial code);
- New requirement for a minimum efficiency standard for fireplaces (residential code);
- New general section to prohibit continuously burning pilot lights (residential code); and
- Revised additional required energy credits to discourage the use of gas furnaces (residential code).

In addition to the energy credits, the Code provides “Fuel Normalization Credits” that establish a negative 1 credit for solely electric resistance systems as well as all heating energy sources other than heat pumps. This penalty must be compensated by other energy credit options. It is important to note that gas is not totally ruled out because installation of a high efficiency gas furnace earns 1 credit back. However, it makes no headway towards satisfying the bottom-line additional requirement.

Inquiries to local Shoreline builders indicate that it is too early to conclude the impact of these new provisions since most new ongoing construction projects were vested under the prior Energy Code. Heat pump systems are common, but high efficiency gas furnaces already represent a significant percentage of new installations as an exercised option under prior Energy Code compliance, so the true impact of the 2018 WSEC remains to be seen.

## **Limits to Local Options**

As was discussed with Council on August 16<sup>th</sup>, while local jurisdictions have free reign to modify the State commercial Energy Code, state law restricts local jurisdictions from making the residential Energy Code anything other than equivalent to the State Code. The term “Mini-Maxi” is used to reflect this limitation depicting this code as both a minimum as well as a maximum requirement. The only flexibility is in the form of additional energy credit options that must be selected beyond baseline requirements based on the new dwelling size in square feet. The minimum additional credits required are three (3), six (6), and seven (7) for small, medium, and large dwelling units respectively. The 2018 Energy Code also addresses apartment building units and additions separately.

## **DISCUSSION**

As noted above, the City Council discussed this topic on August 16, 2021 and confirmed support for a natural gas ban on space/water heating solely for new commercial construction. While there were a number of public comments in support of this action, further consultation with the affected utility providers was deemed to be in order which is addressed herein below.

Staff also agreed to delve deeper into building industry stakeholder input that contributed to the development of the proposed amendments. A detailed synopsis of building industry stakeholder outreach conducted by the City of Seattle and amendment changes that resulted directly from this effort is provided in Attachment B.

A Shoreline Municipal Code envisioned ban for the use of fossil fuels for space/water heating in new commercial construction, including multi-family dwelling unit buildings that are four stories or more, is included in proposed Ordinance No. 948 (Attachment A). This proposed ordinance would amend SMC Title 15 and provide local amendments to the State Construction Codes, specifically amending the State Energy Code Commercial Provisions and adding them to a new section of the SMC – 15.05.090. This approach provides consistency for builders operating in Seattle, Shoreline and King County and yield regional emission reduction benefits. Adoption of essentially the same amendments on the whole will also help to validate electric utility projections.

As noted above under the “City of Seattle Fossil Fuel Ban” section, Seattle’s energy code amendments address this issue. Proposed Ordinance No. 948 specifically addresses the envisioned ban of fossil fuel-fired heating equipment in Exhibit A to the Ordinance under sections C403.1.4 and C406.2; as well as water heating service under Section C406.8. These sections of the newly proposed Code, in conjunction with the numerous incrementally increased efficiency factor adjustments, will result in energy savings to mitigate the associated shift from fossil fuel to electric based demand.

### **Puget Sound Energy Feedback**

A position statement was provided to staff by Puget Sound Energy (PSE) Local Government Affairs and Public Policy Manager Julien Loh (Attachment C) wherein they consider Shoreline’s proposed ban on all forms of carbon-based heating in commercial and multifamily residential buildings to be “shortsighted” and that the City should stick with the current State Energy Code, as written. This observation however fails to consider that many of these proposed provisions are now being evaluated for inclusion in the next update of the State Energy Code projected for implementation as early as July of 2023. PSE also urged that Seattle City Light be further consulted on the topic of electrification impacts, which resulted in a confirmation as follows:

*Seattle City Light Statement on Energy Code Impacts, SEPA Analysis*  
*Amendments to the Seattle Energy Code will continue to reduce the use of utility generation resources due to the more stringent energy efficiency requirements.*

*However, the code amendments shifting from fossil fuel to all-electric building operations may contribute to localized impacts on parts of the utility's distribution infrastructure due to increased electric demand. City Light expects to undertake the analysis of building and transportation decarbonization impacts and mitigation options in 2021.*

A further detailed review on our behalf of the Seattle amendments by Duane Jonlin, Seattle Energy Code and Conservation Advisor, indicated that the following items are not appropriate for Shoreline adoption and therefore have not been included in the proposed ordinance:

- C403.11.1 - Heating outside a building: The State Building Code Committee Technical Advisory Group (SBCC TAG) brought up a lot of potential issues with this Seattle amendment when proposed for consideration for the next WSEC update, so the proposal was withdrawn. It is therefore recommended to not adopt the Seattle changes to this section.
- C404.2.1 Standard for huge central water heating systems – Seattle is delaying implementation of this provision and it is extremely rare for any non-residential building to need a million BTU/h water heating system, so this section need not be adopted in Shoreline.
- C404.2.2 - Since the Shoreline code will go into effect next year this section need not be adopted.

For Council information, additional consultation with King County staff regarding their local pursuit of adopting the Seattle amendments is provided in this update. King County Building and Fire Codes have not been substantially updated since 2009 and include surveyed regional fire and building code proposals in addition to the Seattle energy code amendments. This is the first time King County is proposing Energy Conservation Code amendments. They have specifically opted to not adopt the Seattle energy metering amendments because of insufficient time to tackle this issue in consideration of the substantial breadth of their entire ordinance. The metering amendments in question continue to be included in the proposed Shoreline ordinance.

Bellingham's City Council is also considering adoption of a comparable set of commercial energy code amendments this month (November 2021).

### **Tonight's Council Discussion**

Given the State's Mini-Maxi restrictions for the residential Energy Code, and the fact that the Regional Code Collaboration Suggested 2018 Energy Code Amendment Package continues to be pursued in other jurisdictions, albeit at a slower pace, staff recommends that Council move forward with adoption of proposed Ordinance No. 948. Potential Council action on proposed Ordinance No. 948 is currently scheduled for December 6, 2021. It is also currently proposed that if enacted, these requirements would become effective July 1, 2022. This will provide building industry stakeholders time to be educated on these new Code provisions.



## **RESOURCE/FINANCIAL IMPACT**

There is no direct financial impact to this proposed action, other than City staff time being required to implement the proposed changes to SMC Title 15 and provide outreach to local builders.

## **RECOMMENDATION**

This is a discussion item only; no action is required tonight. Based on feedback from the Council discussion on August 16, 2021, staff recommends that the Council further discuss the Regional Code Collaboration Suggested Commercial Energy Code Amendments and provide staff feedback on the proposed ordinance for Council consideration that aligns with these amendments. Council action on proposed Ordinance No. 948 is currently scheduled for December 6, 2021.

## **ATTACHMENTS**

- Attachment A: Proposed Ordinance No. 948, including Exhibit A
- Attachment B: Information on Seattle Energy Code Outreach
- Attachment C: October 14, 2021 Email From Puget Sound Energy Local Government Affairs and Public Policy Manager Julien Loh Regarding Shoreline Energy Code Updates

**ORDINANCE NO. 948**

**AN ORDINANCE OF THE CITY OF SHORELINE, WASHINGTON AMENDING CHAPTER 15.05, CONSTRUCTION AND BUILDING CODES, OF THE SHORELINE MUNICIPAL CODE, TO PROVIDE AMENDMENTS TO THE WASHINGTON STATE ENERGY CODE - COMMERCIAL, AS ADOPTED BY THE STATE OF WASHINGTON.**

WHEREAS, the City of Shoreline is a non-charter optional municipal code city as provided in Title 35A RCW, incorporated under the laws of the state of Washington, and planning pursuant to the Growth Management Act, Chapter 36.70A RCW; and

WHEREAS, the Washington State Building Code Council has adopted the State Amendments to the 2018 International Energy Conservation Code; these amendments are contained in Chapter 51-11C (Commercial) and Chapter 51-11R (Residential) of the Washington Administrative Code (“WAC”), collectively the Washington State Energy Code; and

WHEREAS, Section 15.05.010(H) of the Shoreline Municipal Code (“SMC”) adopts the Washington State Energy for the City of Shoreline, referencing WAC 51-11; which was repealed and replaced with WAC 51-11C and WAC 51-11R; and

WHEREAS, the City of Shoreline has a long-standing commitment to promote environmental sustainability in municipal operations and throughout the community as a whole, including adoption of a Climate Action Plan to reduce climate change-causing greenhouse gas (GHG) emissions in Shoreline and participation in the King County-Cities Climate Collaboration; and

WHEREAS, the City’s current Energy Code set forth in SMC 15.05.010(H) consists solely of the International Energy Conservation Code with Washington state amendments; and

WHEREAS, by adding amendments for commercial buildings, the City will advance towards its climate goals as these buildings will incrementally improve their building insulation, space heating, water heating, lighting, and renewable energy systems so as to reduce building energy use and carbon emissions; and

WHEREAS, Chapter 15.05 SMC needs to be amended to reflect the repeal of WAC 51-11 and the creation of WAC chapters for residential and commercial, and to add a new section to reflect the City’s amendments to the commercial provisions of the State Energy Code contained in WAC 51-11C;

**NOW THEREFORE, THE CITY COUNCIL OF THE CITY OF SHORELINE, WASHINGTON DO ORDAIN AS FOLLOWS:**

**Section 1. Amendment.** Shoreline Municipal Code Section 15.05.010(H), is amended to read as follows:

H. The current edition of the ~~Washington State Energy Code~~ International Energy Conservation Code published by the International Code Council, Inc., as adopted by the

Washington State Building Code Council in Chapter 51-11C WA and Chapter 51-11R WAC, as now or hereafter amended.

**Section 2. New Section – SMC 15.05.090 Commercial Energy Code Amendments.** A new section, Section 15.05.090, Commercial Energy Code Amendments, is hereby added to Chapter 15.05 as set forth in Exhibit A, which is attached hereto and incorporated herein.

**Section 3. Corrections by City Clerk or Code Reviser.** Upon approval of the City Attorney, the City Clerk and the code reviser are authorized to make necessary corrections to this Ordinance, including the correction of clerical errors; references to other local, state, or federal laws, codes, rules, or regulations; or ordinance numbering and section/subsection numbering.

**Section 4. Severability.** Should any section, subsection, paragraph, sentence, clause, or phrase of this Ordinance or its application to any person or situation be declared unconstitutional or invalid for any reason, such decision shall not affect the validity of the remaining portions of this Ordinance or its application to any person or situation.

**Section 5. Publication and Effective Date.** A summary of this Ordinance consisting of the title shall be published in the official newspaper. This Ordinance shall take effect at 12:01 am on July 1, 2022. All permit applications received after the effective date are subject the 2018 International Energy Conservation Code, as amended by the State Building Code Council and modified by the City’s local amendments set forth in SMC 15.05.090.

**PASSED BY THE CITY COUNCIL ON DECEMBER 6, 2021.**

\_\_\_\_\_  
Mayor Will Hall

**ATTEST:**

**APPROVED AS TO FORM:**

\_\_\_\_\_  
Jessica Simulcik Smith  
City Clerk

\_\_\_\_\_  
Julie Ainsworth-Taylor  
Assistant City Attorney on behalf of  
Margaret King, City Attorney

Date of publication:       , 2021  
Effective date:           , 2021

**NOTE:** Only the following provisions of the Washington State Energy Code - Commercial, as adopted by the Washington State Building Code Council, WAC 51-11C, are added, amended, or deleted as provided in this exhibit. All other provisions of the Energy Code – Commercial remain as stated in WAC 51-11C.

## **A NEW SECTION, SECTION 15.05.090 COMMERCIAL ENERGY CODE AMENDMENTS IS ADDED TO CHAPTER 15.05 BUILDING CODES**

### **AMENDMENTS TO CHAPTER 1 SCOPE AND ADMINISTRATION**

#### **SECTION C101 SCOPE AND GENERAL REQUIREMENTS**

##### **Section C101.1 is amended to read as follows:**

**C101.1 Title.** This code, consisting of Chapter 1 [CE] through Chapter ((5)) 6 [CE] and Appendices A through D, shall be known as the *Washington State Energy Code*, and shall be cited as such. It is referred to herein as “this code.”

##### **Section C101.3 is amended to read as follows:**

**C101.3 Intent.** This code shall regulate the design and construction of buildings for the use and conservation of energy and the reduction of carbon emissions over the life of each building. This code is intended to provide flexibility to permit the use of innovative approaches and techniques to achieve this objective. This code is not intended to abridge safety, health or environmental requirements contained in other applicable codes or ordinances.

\*\*\*\*\*

#### **SECTION C102 ALTERNATIVE MATERIALS, DESIGN AND METHODS OF CONSTRUCTION AND EQUIPMENT**

##### **Section C102.1 is amended to read as follows:**

**C102.1 General.** The provisions of this code (~~(are not intended to)~~) do not prevent the installation of any material, or to prohibit any design or method of construction prohibited by this code or not specifically ((prescribed)) allowed by this code, provided that any such alternative has been *approved*. An alternative material, design or method of construction shall be *approved* where the *code official* finds that the proposed design is satisfactory and complies with the intent of the

provisions of this code, and that the material, method or work offered is, for the purpose intended, not less than the equivalent of that prescribed in this code in quality, strength, effectiveness, fire resistance, durability and safety. Where the alternative material, design or method of construction is not approved, the *code official* shall respond in writing, stating the reasons why the alternative was not approved.

The *code official* may require that sufficient evidence or proof be submitted to reasonably substantiate any claims regarding the use or suitability of the alternate. The *code official* may, but is not required to, record the approval of modifications and any relevant information in the files of the building official or on the *approved* permit plans.

**A new section, Section C102.2 Modifications is added and shall read as follows:**

**C102.2 Modifications.** The *code official* may modify the requirements of this code for individual cases provided the *code official* finds: (1) there are practical difficulties involved in carrying out the provisions of this code; (2) the modification is in conformity with the intent and purpose of this code; (3) the modification will provide a reasonable level of fire protection and structural integrity when considered together with other safety features of the building or other relevant circumstances, and (4) the modification maintains or improves the energy efficiency of the building. The *code official* may, but is not required to, record the approval of modifications and any relevant information in the files of the *code official* or on the *approved* permit plans.

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**AMENDMENTS TO CHAPTER 2 DEFINITIONS**

**SECTION C202 GENERAL DEFINITIONS**

**The following new definitions are added to Section C202 and shall read as follows:**

**AFFORDABLE HOUSING.** Affordable housing for the purposes of this code shall have the same meaning as set forth in SMC Chapter 3.27 Property Tax Exemption, as amended, except for affordable housing located within the City's MUR zoning districts. Affordable housing in the MUR zoning districts shall have the same meaning as set forth in SMC 20.40.325.

**AUTOMATIC CONTROL DEVICE.** A device capable of automatically turning loads off and on without manual intervention.

**CONTROLLED RECEPTACLE.** An electrical receptacle that is controlled by an *automatic control device*.

**IT (INFORMATION TECHNOLOGY) ENERGY.** Electrical energy consumed by UPS (uninterruptible power supply) units, servers, and associated electronic data storage and data processing equipment, but not by lighting or HVAC equipment.

**MULTI-PASS.** A heat pump water heater control strategy requiring multiple passes of water through the heat pump to reach the final target storage water temperature.

**SINGLE-PASS.** A heat pump water heater control strategy using variable flow or variable capacity to deliver water from the heat pump at the final target storage water temperature in a single pass through the heat exchanger with variable incoming water temperatures.

**SOLAR ZONE.** A clear area or areas reserved solely for current and future installation of photovoltaic or solar hot water systems.

**TEMPERATURE MAINTENANCE.** The system used to maintain the temperature of the building domestic hot water delivery system, typically by circulation and reheating or by a heat trace system.

**The following EXISTING definitions are amended to read as follows:**

**ATTIC AND OTHER ROOFS.** ~~All other roofs,~~ Roofs other than roofs with insulation entirely above deck and metal building roofs, including roofs with insulation entirely below (inside of) the roof structure (i.e., attics, cathedral ceilings, and single-rafter ceilings), roofs with insulation both above and below the roof structure, and roofs without insulation ~~but excluding roofs with insulation entirely above deck and metal building roofs.~~

**BUILDING ENTRANCE.** Any doorway, set of doors, revolving door, vestibule, or other form of portal (including elevator doors such as in parking garages) that is ordinarily used to gain access to the building or to exit from the building by its users and occupants. This does not include doors solely used to directly enter mechanical, electrical, and other building utility service equipment rooms, or doors for emergency egress only. Where buildings have separate one-way doors to enter and leave, this also includes any doors ordinarily used to leave the building.

**COMPUTER ROOM.** A room whose primary function is to house equipment for the processing and storage of electronic data and that has a design total *information technology equipment (ITE)* equipment load less than or equal to 20 watts per square foot of *conditioned floor area* (215 watts/m<sup>2</sup>) or a design *ITE* equipment load less than or equal to 10 kW. See also *data center*.

**CONDITIONED SPACE.** An area, room or space that is enclosed within the building thermal envelope and that is directly heated or cooled or that is indirectly heated or cooled. Spaces are indirectly heated or cooled where they communicate through openings with conditioned spaces, where they are separated from conditioned spaces by uninsulated walls, floors or ceilings, or where they contain uninsulated ducts, piping or other sources of heating or cooling. Elevator shafts, stair enclosures, enclosed corridors connecting conditioned spaces, and enclosed spaces through which conditioned air is transferred at a rate exceeding three air changes per hour are considered conditioned spaces for the purposes of the building thermal envelope requirements.

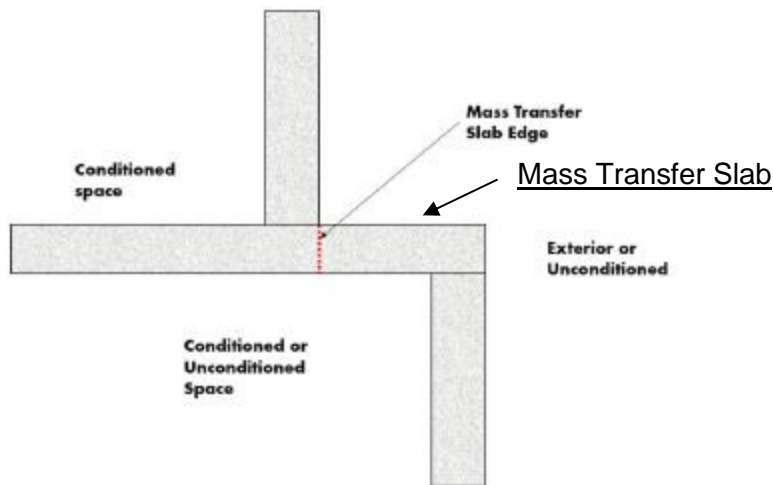
**CONTINUOUS INSULATION (CI).** Insulating material that is continuous across all structural members without metal thermal bridges other than fasteners that have a total cross-sectional area not greater than 0.04 percent (0.12 percent where all metal thermal bridges are stainless steel) of the envelope surface through which they penetrate, and service openings. It is installed on the interior or exterior or is integral to any opaque surface of the building envelope.

**CONTROLLED PLANT GROWTH ENVIRONMENT.** Group F and U buildings or spaces that are used exclusively for and specifically controlled to facilitate and enhance plant growth and production by manipulating various indoor environmental conditions. Technologies include indoor agriculture,

cannabis growing, hydroponics, aquaculture and aquaponics. Controlled indoor environment variables include, but are not limited to, temperature, air quality, humidity and carbon dioxide.

**LUMINAIRE-LEVEL LIGHTING CONTROL.** A lighting system consisting of one or more *luminaires* where each *luminaire* has embedded lighting control logic, occupancy and ambient light sensors, and local override switching capability, where required. Each *luminaire* shall also have local or central wireless networking capabilities to detect and share information with other *luminaires* to adjust to occupancy and/or daylight in the space.

**MASS TRANSFER DECK SLAB ((EDGE)).** ~~That portion of the above-grade wall made up of the concrete slab where it extends past the footprint of the floor above.)~~ A concrete slab designed to transfer structural load from the building perimeter wall or column line above, laterally to an offset wall or column line below, and which has conditioned or semi-heated space on the inside of the upper wall and exterior or unconditioned space on the outside of the upper wall. The area of the slab edge shall be defined as the thickness of the slab multiplied by the ((perimeter)) length of the edge condition. Examples of this condition include, but are not limited to, the transition from an above-grade structure to a below-grade structure or the transition from a tower to a podium. A cantilevered concrete balcony does not constitute a mass transfer deck slab.



**SPACE CONDITIONING CATEGORY** Categories are based on the allowed peak space conditioning output capacity per square foot of *conditioned floor area*, or the design set point temperature, for a building or space. Space conditioning categories from lowest to highest include: low energy, semi-heated, conditioned, refrigerated walk-in and warehouse coolers, and refrigerated walk-in and warehouse freezers.

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## AMENDMENTS TO CHAPTER 3 GENERAL REQUIREMENTS

### SECTION C302 DESIGN CONDITIONS

Section C302.2 is amended to read as follows:

**C302.2 Exterior design conditions.** The heating or cooling outdoor design temperatures shall be selected from Appendix G 24°F for heating and 86°F dry bulb and 67°F wet bulb for cooling.

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## **AMENDMENTS TO CHAPTER 4 COMMERCIAL ENERGY EFFICIENCY**

### **SECTION C401 GENERAL**

#### **Section 401.2 is amended to read as follows:**

**C401.2 Application.** Commercial buildings shall comply with one of the following:

1. **Prescriptive Path.** The requirements of ~~Sections C402, C403, C404, C405, C406, C408, C409, C410 and C411~~ all of Chapter 4, other than Section C407.
2. **Total Building Performance Path.** The requirements of Section C407.
3. **Appendix F is not adopted by the City.** ~~When adopted by the local jurisdiction, the requirements of Appendix F, Outcome-Based Energy Budget, Sections C408, C409, C410, C411 and any specific section in Table C407.2 as determined by the local jurisdiction. The Proposed Total UA of the proposed building shall be no more than 20 percent higher than the Allowed Total UA as defined in Section C402.1.5.~~

\*\*\*\*\*

### **SECTION C402 BUILDING ENVELOPE REQUIREMENTS**

#### **Section 402.1 General is amended to include the following Informative Note:**

##### **C402.1 General.**

<p><b>City Informative Note:</b> For the application of the building envelope requirements to elevator shafts and stair enclosures, see the definition of <i>conditioned space</i> in Chapter 2 and the exception to Section C402.1.3.</p>
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#### **Section 402.1.12 is amended to read as follows:**

**C402.1.1.2 Semi-heated buildings and spaces.** The building envelope of *semi-heated* buildings, or portions thereof, shall comply with the same requirements as that for *conditioned spaces* in Section C402, except as modified by this section. The total installed output capacity of mechanical space conditioning systems serving a *semi-heated* building or space shall comply with Section C202, except as modified by this section. Building envelope assemblies separating *conditioned space* from semi-heated space shall comply with the exterior envelope insulation requirements. Semi-heated spaces heated by mechanical systems that do not include electric resistance heating equipment are not required to comply with the opaque wall insulation provisions of Section C402.2.3 for walls that separate semi-heated spaces from the exterior or low energy spaces. Fenestration that forms part of the *building thermal envelope* enclosing semi-heated spaces shall



comply with Section C402.4. Semi-heated spaces shall be calculated separately from other *conditioned spaces* for compliance purposes.

Opaque walls in semi-heated spaces shall be calculated as fully code compliant opaque walls for both the target and proposed for the Target UA calculations for the component performance alternative in Section C402.1.5, and for the ~~Standard Reference~~ Baseline Building Design for Total Building Performance compliance per Section C407. The capacity of heat trace temperature maintenance systems complying with Section C404.7.2 that are provided for freeze protection of piping and equipment only, shall not be included in the total installed output capacity of mechanical space conditioning systems.

**Exception:** Building or space may comply as *semi-heated* when served by ~~one or more of~~ the following system alternatives:

1. Electric infrared heating equipment for localized heating applications controlled by occupant sensing devices in compliance with Section C403.11.1.
2. ~~Heat pumps with cooling capacity permanently disabled, as pre-approved by the jurisdiction.~~

**City Informative Note:** There is no separate “freeze protection” space conditioning category for unoccupied utility buildings. Spaces with no cooling and less than 3.4 BTU/h-ft<sup>2</sup> heating capacity are not required to be insulated. The opaque walls of spaces that meet the definition of “semiheated” in Chapter 2 are not required to be insulated, but otherwise the thermal envelope of semiheated spaces must meet all requirements for *conditioned space*. Spaces with any mechanical cooling or with more than 8 BTU/h-ft<sup>2</sup> heating capacity must meet all the *building thermal envelope* requirements for *conditioned space*.

**Section C402.1.3 is amended to read as follows:**

**C402.1.3 Insulation component *R*-value method.** *Building thermal envelope* opaque assemblies shall comply with the requirements of Section C402.2 based on the climate zone specified in Chapter 3. For opaque portions of the building thermal envelope intended to comply on an insulation component *R*-value basis, the *R*-values for insulation shall not be less than that specified in Table C402.1.3. Commercial buildings or portions of commercial buildings enclosing Group R occupancies shall use the *R*-values from the "Group R" column of Table C402.1.3. Commercial buildings or portions of commercial buildings enclosing occupancies other than Group R shall use the *R*-values from the "All other" column of Table C402.1.3.

**Exception:** For stair and elevator shafts that do not comply with Section C402.1.2.1 and that are located within enclosed garages or other enclosed non-conditioned spaces and without conditioned supply air or cooling or heating appliances rated higher than 2 kW in any shaft, walls enclosing the shafts are permitted to be:

1. Concrete or masonry with minimum R-5 *continuous insulation*;
2. Metal studs with R-15 *cavity insulation* and without *continuous insulation*; or
3. Other assemblies with a maximum U-value of 0.120.

Slab floors, intermediate mass floor edges and elevator pits within shafts using this exception are excluded from envelope insulation requirements. Shaft surfaces using this exception shall not be included in the gross exterior wall area for purposes of maximum fenestration area calculations in

Section C402.4.1 component performance calculations in Section C402.1.5, or for the total building performance calculation of Section C407.

**Table C402.1.3 is amended to read as follows:**

**TABLE C402.1.3  
 OPAQUE THERMAL ENVELOPE INSULATION COMPONENT  
 MINIMUM REQUIREMENTS, R-VALUE METHOD<sup>a, i</sup>**

CLIMATE ZONE	5 AND MARINE 4	
	All Other	Group R
<b>Roofs</b>		
Insulation entirely above deck	R-38ci	R-38ci
Metal buildings <sup>b</sup>	R-25 .+ R-14 R-22 LS	R-25 .+ R-14 R-22 LS
Attic and other	R-49	R-49
<b>Walls, Above Grade<sup>i</sup></b>		
Mass <sup>h</sup>	R-9.5 <sup>c</sup> -ci Exterior: R-16 c.i. Interior: R-13 + R-6 ci wood stud, or R-13 + R-10 ci metal stud	R-13.3ci Exterior: R-16 c.i. Interior: R-13 + R-6 ci wood stud, or R-13 + R-10 ci metal stud
Mass transfer deck slab edge	R-5 N/R	R-5 N/R
Metal building	R-19ci or R-13+13ci	R-19ci or R-13+13ci
Steel framed	R-13 .+ R-10ci	R-19 .+ R-8.5ci
Wood framed and other	R-21 int or R-15+5ci std R-13 + R-7.5 ci	R-13+7.5ci std or R-20+3.8ci std or R-25 std
<b>Walls, Below Grade</b>		
Below-grade wall <sup>d, h</sup>	Same as above grade Exterior: R-10 ci Interior: R-19 wood stud, or R-13 + R-6 ci metal stud	Same as above grade Exterior: R-10 ci Interior: R-19 wood stud, or R-13 + R-6 ci metal stud
<b>Floors</b>		
Mass <sup>f</sup>	R-30ci	R-30ci
Joist/framing	R-30 <sup>e</sup> Steel frame: R-38 +R-10 ci Wood frame: R-38	R-30 <sup>e</sup> Steel frame: R-38 +R-10 ci Wood frame: R-38

CLIMATE ZONE	5 AND MARINE 4	
	All Other	Group R
<b>Slab-on-Grade Floors</b>		
Unheated slabs	R-10 for 24" below	R-10 for 24" below
Heated slabs <sup>d</sup>	R-10 perimeter & under entire slab	R-10 perimeter & under entire slab
<b>Opaque Doors<sup>g</sup></b>		
<u>Swinging</u>	<u>U-0.37</u>	<u>U-0.37</u>
<u>Nonswinging</u>	R-4.75	R-4.75

Keys for Table C402.1.3

For SI: 1 inch = 25.4 mm. ci = Continuous insulation. NR = No requirement. LS = Liner system

Footnotes for Table C402.1.3

- a. Assembly descriptions can be found in Chapter 2 and Appendix A.
- b. Where using R-value compliance method, a thermal spacer block with minimum thickness of ½ inch and minimum R-value of R-3.5 shall be provided, otherwise use the U-factor compliance method in Table C402.1.4.
- c. ~~(Reserved) ((Exception: Integral insulated concrete block walls complying with ASTM C90 with all cores filled and meeting both of the following:~~
  - 1. ~~At least 50 percent of cores must be filled with vermiculite or equivalent fill insulation; and~~
  - 2. ~~The building thermal envelope encloses one or more of the following uses: Warehouse (storage and retail), gymnasium, auditorium, church chapel, arena, kennel, manufacturing plant, indoor swimming pool, pump station, water and waste water treatment facility, storage facility, storage area, motor vehicle service facility. Where additional uses not listed (such as office, retail, etc.) are contained within the building, the exterior walls that enclose these areas may not utilize this exception and must comply with the appropriate mass wall R-value from Table C402.1.3/U-factor from Table C402.1.4.)~~
- d. Where heated slabs are below grade, they shall comply with the insulation requirements for heated slabs.
- e. ~~(Reserved) ((Steel floor joist systems shall be insulated to R-38 + R-10ci.))~~
- f. "Mass floors" shall include floors weighing not less than:
  - 1. 35 pounds per square foot of floor surface area; or
  - 2. 25 pounds per square foot of floor surface area where the material weight is not more than 120 pounds per cubic foot.
- g. Not applicable to *garage doors*. See Table C402.1.4.
- h. Peripheral edges of intermediate concrete floors are included in the above grade mass wall category and therefore must be insulated as above grade mass walls unless they meet the definition of Mass Transfer Deck Slab Edge. The area of the peripheral edges of concrete floors shall be defined as the thickness of the slab multiplied by the perimeter length of the edge condition. See Table A103.3.7.2 for typical default u-factors for above grade slab edges and footnote c for typical conditions of above grade slab edges.
- i. Where the total area of through-wall mechanical equipment is greater than 1 percent of the opaque above-grade wall area, use of the R-value method is not permitted. See Section C402.1.4.2.
- ~~((i))~~ j. For roof, wall or floor assemblies where the proposed assembly would not be *continuous insulation*, ~~((an))~~ alternate nominal R-value compliance ~~((option))~~ options for assemblies with isolated metal ~~((penetrations of))~~ fasteners that penetrate otherwise continuous insulation ((is)) are as shown in Columns B and C of Table C402.1.3(i):

**Table C402.1.3(j) is amended to read as follows:**

**Table C402.1.3(j)**  
**Continuous Insulation Equivalents**

<u>Column A</u>	<u>Column B</u>	<u>Column C</u>
Assemblies with continuous insulation (see definition)	Alternate option for assemblies with metal penetrations, greater than 0.04% but less than 0.08%	Alternate option for assemblies with metal penetrations, greater than or equal to 0.08% but less than 0.12%

R-9.5ci	R-11.9ci	R-13ci
R-11.4ci	R-14.3ci	R-15.7ci
R-13.3ci	R-16.6ci	R-18.3ci
R-15.2ci	R-19.0ci	R-21ci
R-30ci	R-38ci	R-42ci
R-38ci	R-48ci	R-53ci
R-13 + R-7.5ci	R-13 + R-9.4ci	R-13 + R-10.3ci
R-13 + R-10ci	R-13 + R-12.5ci	R-13 + R-13.8ci
R-13 + R-12.5ci	R-13 + R-15.6ci	R-13 + R-17.2ci
R-13 + R-13ci	R-13 + R-16.3ci	R-13 + R-17.9ci
R-19 + R-8.5ci	R-19 + R-10.6ci	R-19 + R-11.7ci
R-19 + R-14ci	R-19 + R-17.5ci	R-19 + R-19.2ci
R-19 + R-16ci	R-19 + R-20ci	R-19 + R-22ci
R-20 + R-3.8ci	R-20 + R-4.8ci	R-20 + R-5.3ci
R-21 + R-5ci	R-21 + R-6.3ci	R-21 + R-6.9ci

Footnotes for Table C402.1.3(j)

~~(This)~~ These alternate nominal R-value compliance ~~(option is)~~ options are allowed for projects complying with all of the following:

1. The ratio of the cross-sectional area, as measured in the plane of the surface, of metal penetrations of otherwise *continuous insulation* to the opaque surface area of the assembly is greater than 0.0004 (0.04%), but less than 0.0008 (0.08%), for use of Column B equivalents, and greater than or equal to 0.0008 (0.08%), but less than 0.0012 (0.12%), for use of Column C equivalents.

a. Where all metal penetrations are stainless steel, Column B is permitted to be used for penetrations greater than 0.12% but less than 0.24% of opaque surface area, and Column C is permitted to be used for penetrations greater than or equal to 0.24% but less than 0.48% of opaque surface area.

2. The metal penetrations of otherwise *continuous insulation* are isolated or discontinuous (e.g., brick ties or other discontinuous metal attachments, offset brackets supporting shelf angles that allow insulation to go between the shelf angle and the primary portions of the wall structure). No continuous metal elements (e.g., metal studs, z-girts, z-channels, shelf angles) penetrate the otherwise continuous portion of the insulation.

3. Building permit drawings shall contain details showing the locations and dimensions of all the metal penetrations (e.g., brick ties or other discontinuous metal attachments, offset brackets, etc.) of otherwise *continuous insulation*. In addition, calculations shall be provided showing the ratio of the cross-sectional area of metal penetrations of otherwise *continuous insulation* to the overall opaque wall area.

For other cases where the proposed assembly is not *continuous insulation*, see Section C402.1.4 for determination of U-factors for assemblies that include metal other than screws and nails.

**Section C402.1.4.1 is amended to read as follows:**

**C402.1.4.1 Thermal resistance of cold-formed steel stud walls.** *U*-factors of walls with cold-formed steel studs shall be permitted to be determined either by using the values in Table C402.1.4.1, or in accordance with Equation 4-1:

$$U = 1/[R_s + (ER)] \quad \text{(Equation 4-1)}$$

where:

*R<sub>s</sub>* = The cumulative *R*-value of the wall components along the path of heat transfer, excluding the cavity insulation and steel studs.

*ER* = The effective *R*-value of the cavity insulation with steel studs.

**A new section, Section C402.1.4.2 is added and shall read as follows:**

**C402.1.4.2 Thermal resistance of mechanical equipment penetrations.** When the total area of penetrations from through-wall mechanical equipment or equipment listed in Table C403.3.2(3) exceeds 1 percent of the opaque above-grade wall area, the mechanical equipment penetration area shall be calculated as a separate wall assembly with a default U-factor of 0.5. Mechanical system ducts and louvers, including those for supply, exhaust and relief, and for condenser air intake and outlet, are not considered to be mechanical equipment for the purposes of this section.

**Exception:** Where mechanical equipment has been tested in accordance with approved testing standards, the mechanical equipment penetration area is permitted to be calculated as a separate wall assembly using the U-factor determined by such test.

**Table C402.1.4 is amended to read as follows:**

**TABLE C402.1.4  
 OPAQUE THERMAL ENVELOPE ASSEMBLY MAXIMUM REQUIREMENTS,  
 U-FACTOR METHOD<sup>a, f</sup>**

	CLIMATE ZONE 5 AND MARINE 4	
	All Other	Group R
<b>Roofs</b>		
Insulation entirely above deck	U-0.027	U-0.027
Metal buildings	<del>U-0.034</del> <u>U-0.027</u>	<del>U-0.034</del> <u>U-0.027</u>
Attic and other	U-0.021	U-0.021
Joist or single rafter	U-0.027	U-0.027
<b>Walls, Above Grade</b>		
Mass <sup>g,k</sup>	<del>U-0.104<sup>d</sup></del> <u>U-0.057</u>	<del>U-0.078</del> <u>U-0.057</u>
Mass transfer deck slab edge <sup>i</sup>	U-0.20	U-0.20
<u>Slab penetrating thermal envelope wall<sup>h</sup></u>	<u>U-0.10</u>	<u>U-0.10</u>
Metal building <sup>k</sup>	U-0.052	U-0.052
Steel framed <sup>k</sup>	U-0.055	U-0.055
Wood framed and other <sup>k</sup>	<del>U-0.054</del> <u>U-0.051</u>	U-0.051
<b>Walls, Below Grade</b>		
<i>Below-grade wall<sup>p,g</sup></i>	<del>Same as above grade</del> <u>U-0.070</u>	<del>Same as above grade</del> <u>U-0.070</u>
<b>Floors</b>		
Mass <sup>e</sup>	U-0.031	U-0.031
Joist/framing	<del>U-0.029</del> <u>U-0.029 steel joist</u> <u>U-0.025 wood joist</u>	<del>U-0.029</del> <u>U-0.029 steel joist</u> <u>U-0.025 wood joist</u>

Concrete column or concrete wall penetrating thermal envelope floor <sup>i</sup>	<u>U-0.55</u>	<u>U-0.55</u>
Concrete slab floor directly above an electrical utility vault	<u>N.R.</u>	<u>N.R.</u>
<b>Slab-on-Grade Floors</b>		
Unheated slabs	F-0.54	F-0.54
Heated slabs <sup>c</sup>	F-0.55	F-0.55
<b>Opaque Doors</b>		
<i>Swinging door</i>	U-0.37	U-0.37
<i>Nonswinging door</i>	U-0.34	U-0.34
<i>Garage door &lt;14% glazing</i>	U-0.31	U-0.31

Footnotes for Table C402.1.4

- a. Use of opaque assembly *U*-factors, *C*-factors, and *F*-factors from Appendix A is required unless otherwise allowed by Section C402.1.4.
- ~~b. (Reserved) ((Where heated slabs are below grade, they shall comply with the *F*-factor requirements for heated slabs.))~~
- c. Heated slab *F*-factors shall be determined specifically for heated slabs. Unheated slab factors shall not be used.
- d. ~~(Reserved) ((Exception: Integral insulated concrete block walls complying with ASTM C90 with all cores filled and meeting both of the following:
 
  1. At least 50 percent of cores must be filled with vermiculite or equivalent fill insulation; and
  2. The building thermal envelope encloses one or more of the following uses: Warehouse (storage and retail), gymnasium, auditorium, church chapel, arena, kennel, manufacturing plant, indoor swimming pool, pump station, water and waste water treatment facility, storage facility, storage area, motor vehicle service facility. Where additional uses not listed (such as office, retail, etc.) are contained within the building, the exterior walls that enclose these areas may not utilize this exception and must comply with the appropriate mass wall R-value from Table C402.1.3/U-factor from Table C402.1.4.))~~
- e. "Mass floors" shall include floors weighing not less than:
  - 35 pounds per square foot of floor surface area; or
  - 25 pounds per square foot of floor surface area where the material weight is not more than 120 pounds per cubic foot.
- f. Opaque assembly *U*-factors based on designs tested in accordance with ASTM C1363 shall be permitted. The *R*-value of *continuous insulation* shall be permitted to be added or subtracted from the original test design.
- g. Peripheral edges of intermediate concrete floors are included in the above grade mass wall category and therefore must be insulated as above grade mass walls unless they meet the definition of Mass Transfer Deck Slab Edge. The area of the peripheral edges of concrete floors shall be defined as the thickness of the slab multiplied by the perimeter length of the edge condition. See Table A103.3.7.2 for typical default *u*-factors for above grade slab edges and footnote c for typical conditions of above grade slab edges.
- h. Intermediate concrete floor slabs penetrating the *building thermal envelope* shall comply with Section C402.2.9. The area of such penetrating concrete floor slabs shall be defined as the thickness of the slab multiplied by the length of the penetration. The "exposed concrete" row in Table A103.3.7.2 shall be used for typical default *U*-factors for the penetrating concrete slab.
- i. Value applies to concrete columns and concrete walls that interrupt mass floor insulation, but not to perimeter walls or columns separating interior *conditioned space* from exterior space.
- j. A mass transfer deck, due to its configuration, is not insulated. The table value (U-0.20) shall be used as the baseline value for component performance or total building performance path calculations. For the proposed value, the appropriate value from the top line of Table A104.3.7.2 shall be used.
- k. Through-wall mechanical equipment subject to Section C402.1.4.2 shall be calculated at the *U*-factor defined in Section C402.1.4.2. The area-weighted *U*-factor of the wall, including through-wall mechanical equipment, shall not exceed the value in the table.

**Section C402.1.5 is amended to read as follows:**

**C402.1.5 Component performance alternative.** Building envelope values and fenestration areas determined in accordance with Equation 4-2 shall be permitted in lieu of compliance with the *U*-factors and *F*-factors in Table C402.1.4 and C402.4 and the maximum allowable fenestration areas in Section

C402.4.1.

For buildings with more than one *space conditioning category*, component performance compliance shall be demonstrated separately for each space conditioning category. Interior partition ceilings, walls, fenestration and floors that separate space conditioning areas shall be applied to the component performance calculations for the space conditioning category with the highest level of space conditioning.

**Proposed Total UA ≤ Allowable Total UA** **(Equation 4-2)**

Where:

<b>Proposed Total UA</b>	=	UA-glaz-prop + UA sky-prop + UA-opaque-prop + FL-slab-prop
<b>Allowable Total UA</b>	=	UA-glaz-allow + UA-glaz-excess + UA sky-allow + UA-sky-excess + UA-opaque-allow + FL-slab-allow
<b>UA-glaz-prop</b>	=	Sum of (proposed U-value x proposed area) for each distinct vertical fenestration type, up to code maximum area
<b>UA-sky-prop</b>	=	Sum of (proposed U-value x proposed area) for each distinct skylight type, up to the code maximum area
<b>UA-opaque-prop</b>	=	Sum of (proposed U-value x proposed area) for each distinct opaque thermal envelope type
<b>FL-slab-prop</b>	=	Sum of (proposed F-value x proposed length) for each distinct slab on grade perimeter assembly
<b>UA-glaz-allow</b>	=	Sum of (code maximum vertical fenestration U-value from Table C402.4, or Section C402.4.1.1.2 if applicable, x proposed area) for each distinct vertical fenestration type, not to exceed the code maximum area <sup>1</sup>
<b>UA-glaz-excess</b>	=	U-value for the proposed wall type from (( <del>Table C402.4</del> ) <u>Table C402.1.4</u> <sup>2</sup> x vertical fenestration area in excess of the code maximum area
<b>UA-sky-allow</b>	=	Sum of (code maximum skylight U-value from Table C402.4 x proposed area) for each distinct skylight type proposed, not to exceed the code maximum area
<b>UA-sky-excess</b>	=	U-value for the proposed roof type from Table C402.4 <sup>3</sup> x skylight area in excess of the code maximum area
<b>UA-opaque-allow</b>	=	Code maximum opaque envelope U-value from Table C402.1.4 for each opaque door, wall, roof, and floor assembly x proposed area
<b>FL-slab-allow</b>	=	Code maximum F-value for each slab-on-grade perimeter assembly x proposed length

**Notes**

1. Where multiple vertical fenestration types are proposed and the code maximum area is exceeded, the U-value shall be the average Table C402.1.4 U-value weighted by the proposed vertical fenestration area of each type.
2. Where multiple wall types are proposed the U-value shall be the average Table C402.1.4 U-value weighted by the proposed above grade wall area of each type.
3. Where multiple roof types are proposed the U-value shall be the average Table C402.1.4 U-value weighted by the proposed roof area of each type.

**Section C402.1.5.1 is amended to read as follows:**

**C402.1.5.1 Component U-factors and F-factors.** The U-factors and F-factors for typical construction assemblies are included in Chapter 3 and Appendix A. These values shall be used for all calculations. Where proposed construction assemblies are not represented in Chapter 3 or Appendix A, values shall be calculated in accordance with the ASHRAE *Handbook of Fundamentals*, using the framing factors listed in Appendix A.

For envelope assemblies containing metal framing, the *U-factor* shall be determined by one of the following methods:

1. Results of laboratory measurements according to acceptable methods of test.
2. ASHRAE *Handbook of Fundamentals* where the metal framing is bonded on one or both sides to a metal skin or covering.
3. The zone method as provided in ASHRAE *Handbook of Fundamentals*.
4. Effective framing/cavity *R*-values as provided in Appendix A. When return air ceiling plenums are employed, the roof/ceiling assembly shall:
  - a. For thermal transmittance purposes, not include the ceiling proper nor the plenum space as part of the assembly; and
  - b. For gross area purposes, be based upon the interior face of the upper plenum surface.
5. Tables in ASHRAE 90.1 Normative Appendix A.
6. Calculation method for steel-framed walls in accordance with Section C402.1.4.1 and Table C402.1.4.1.

**Section C402.2 is amended to read as follows:**

**C402.2 Specific building thermal envelope insulation requirements.** Insulation in building thermal envelope opaque assemblies shall comply with Sections C402.2.1 through ~~C402.2.6~~ C402.2.10 and Table C402.1.3.

Where this section refers to installing insulation levels as specified in Section C402.1.3, assemblies complying with ~~Section C402.1.5~~ C402.1.4 and buildings complying with ~~Section C402.1.5~~ are allowed to install alternate levels of insulation so long as the U-factor of the insulated assembly is less than or equal to the U-factor required by the respective path.

**Section C402.2.1 is amended to read as follows:**

**C402.2.1 Roof assembly.** The minimum thermal resistance (*R*-value) of the insulating material installed either between the roof framing or continuously on the roof assembly shall be as specified in Table C402.1.3, based on construction materials used in the roof assembly. Continuous insulation board shall be installed in not less than 2 layers and the edge joints between each layer of insulation shall be staggered. Insulation installed on a suspended ceiling with removable ceiling tiles shall not be considered part of the minimum thermal resistance of the roof insulation.

**Exceptions:**

1. Continuously insulated roof assemblies where the thickness of insulation varies 1 inch (25 mm) or less and where the area-weighted *U*-factor is equivalent to the same assembly with the *R*-value specified in Table C402.1.3.
2. ~~(Reserved) Where tapered insulation is used with insulation entirely above deck, those roof assemblies shall show compliance on a *U*-factor basis per Section C402.1.4. The effective *U*-factor shall be determined through the use of Tables A102.2.6(1), A102.2.6(2) and A102.2.6(3).~~
3. Two layers of insulation are not required where insulation tapers to the roof deck, such as at roof drains. At roof drains, the immediate 24" x 24" plan area around each roof drain has a minimum insulation requirement of R-13, but otherwise is permitted to be excluded from roof insulation area-weighted calculations.



**A new section, Section C402.2.9 is added and shall read as follows:**

**C402.2.9 Above-grade exterior concrete slabs.** Above-grade concrete slabs that penetrate the building thermal envelope, including but not limited to decks and balconies, shall each include a minimum R-10 thermal break, aligned with the primary insulating layer in the adjoining wall assemblies. Stainless steel (but not carbon steel) reinforcing bars are permitted to penetrate the thermal break. If the Total Building Performance path or the component performance alternative in Section C402.1.5 is utilized and the thermal break required by this section is not provided where concrete slabs penetrate the building thermal envelope, the sectional area of the penetration shall be assigned the default U-factors from the “exposed concrete” row of Table A103.3.7.2.

**Exception:** Mass transfer deck slab edges.

**A new section, Section C402.2.10 is added and shall read as follows:**

**C402.2.10 Vertical fenestration intersection with opaque walls.** Vertical fenestration shall comply with items 1, 2 and 3, as applicable:

1. Where wall assemblies include continuous insulation, the exterior glazing layer of vertical fenestration and any required thermal break in the frame shall each be aligned within 2 inches laterally of either face of the continuous insulation layer.
2. Where wall assemblies do not include continuous insulation, the exterior glazing layer of vertical fenestration and any required thermal break in the frame shall each be aligned within the thickness of the wall insulation layer and not more than 2 inches laterally from the exterior face of the outermost insulation layer.
3. Where the exterior face of the vertical fenestration frame does not extend to the exterior face of the opaque wall rough opening, the exposed exterior portion of the rough opening shall be covered with either a material having an R-value not less than R-3, or with minimum 1.5-inch thickness wood.

**Section C402.4 is amended to read as follows:**

**C402.4 Fenestration.** Fenestration shall comply with Sections C402.4 through C402.4.4 and Table C402.4. Daylight responsive controls shall comply with this section and Section C405.2.4.4.

**Exception:** For prescriptive envelope compliance, single-pane glazing is permitted for security purposes and for revolving doors, not to exceed 1 percent of the gross exterior wall area. Where Section C402.1.5, component performance alternative, is used, the single glazing shall be included in the percentage of the total glazing area, U-factor and SHGC requirements.

**Table C402.4 is amended to read as follows:**

**TABLE C402.4  
BUILDING ENVELOPE FENESTRATION MAXIMUM U-FACTOR AND SHGC  
REQUIREMENTS**

**CLIMATE ZONES 5 AND MARINE 4**

<b>U-factor for Class AW windows rated in accordance with AAMA/CSA101/I.S.2/A440, vertical curtain walls and site-built fenestration products<sup>a</sup></b>		
Fixed <sup>b</sup> U-factor	<del>U-0.38</del> <u>U-0.34</u>	
Operable <sup>c</sup> U-factor	<del>U-0.40</del> <u>U-0.36</u>	
<b>Entrance doors<sup>d</sup></b>		
U-factor	U-0.60	
<b>U-factor for all other vertical fenestration</b>		
Fixed U-factor	<del>U-0.30</del> <u>U-0.26</u>	
Operable <sup>c</sup> U-factor	<u>U-0.28</u>	
<b>SHGC for all vertical fenestration</b>		
<b>Orientation<sup>e,f</sup></b>	<b>SEW</b>	<b>N</b>
<b>PF &lt; 0.2</b>	0.38	0.51
<b>0.2 ≤ PF &lt; 0.5</b>	0.46	0.56
<b>PF ≥ 0.5</b>	0.61	0.61
<b>Skylights</b>		
<b>U-factor</b>	<del>U-0.50</del> <u>U-0.45</u>	
<b>SHGC</b>	<del>0.35</del> <u>0.32</u>	

Footnotes for Table C402.4

- a. U-factor and SHGC shall be rated in accordance with NFRC 100.
- b. "Fixed" includes *curtain wall*, storefront, picture windows, and other fixed windows.
- c. "Operable" includes operable fenestration products other than "entrance doors."
- d. "Entrance door" includes glazed *swinging* entrance doors and *automatic glazed sliding entrance doors*. Other doors which are not entrance doors, including *manually operated* sliding glass doors, are considered "operable."
- e. "N" indicates vertical fenestration oriented within 30 degrees of true north. "SEW" indicates orientations other than "N."
- f. Fenestration that is entirely within the *conditioned space* or is between conditioned and other *enclosed space* is exempt from solar heat gain coefficient requirements and not included in the SHGC calculation.

**City Informative Note:** The category at the top of Table C402.4, labeled "*U-factor for Class AW windows rated in accordance with AAMA/CSA101/I.S.2/A440, vertical curtain walls and site-built fenestration products,*" includes *curtain wall*, storefront, ribbon wall, window wall, and similar site-assembled systems, but does not include typical punched-opening manufactured windows except for "Class AW" windows. Class AW is the AAMA designation for windows typically used in mid-rise and high-rise buildings to resist high wind and water intrusion loads.

**Section C402.4.1 is amended to read as follows:**

**C402.4.1 Maximum area.** The total building vertical fenestration area (not including opaque doors and opaque spandrel panels) shall not exceed ~~30~~ 35 percent of the total building gross above-grade wall area. The skylight area shall not exceed 5 percent of the total building gross roof area (skylight-to-roof ratio).

For buildings with more than one *space conditioning category*, compliance with the maximum

allowed window-to-wall ratio and skylight-to-roof ratio shall be demonstrated separately for each *space conditioning category*. Interior partition ceiling, wall, fenestration and floor areas that separate space conditioning areas shall not be applied to the window-to-wall ratio and skylight-to-roof ratio calculations.

**Section C402.4.1.1 is amended to read as follows:**

**C402.4.1.1 Vertical fenestration maximum area with high performance alternates.** For buildings that comply with Section C402.4.1.1.1 or C402.4.1.1.2, the total building vertical fenestration area is permitted to exceed ~~30~~ 35 percent but shall not exceed 40 percent of the gross above grade wall area for the purpose of prescriptive compliance with Section C402.1.4.

When determining compliance using the component performance alternative in accordance with Section C402.1.5, the total building vertical fenestration area allowed in Equation 4-2 is 40 percent of the above grade wall area for buildings that comply with the vertical fenestration alternates described in this section.

**Section C402.4.1.1.2 is amended to read as follows:**

**C402.4.1.1.2 High-performance fenestration.** All of the following requirements shall be met:

1. All *vertical fenestration* in the building shall comply with the following maximum U-factors:
  - a. U-factor for Class AW windows rated in accordance with AAMA/CSA101/I.S.2/A440, vertical *curtain walls* and site-built fenestration products (fixed) = ~~0.34~~ 0.30
  - b. U-factor for Class AW windows rated in accordance with AAMA/CSA101/I.S.2/A440, vertical *curtain walls* and site-built fenestration products (operable) = 0.36
  - c. Entrance doors = 0.60
  - d. U-factor for all other vertical fenestration, fixed = ~~0.28~~ 0.22
  - e. U-factor for all other vertical fenestration, operable = 0.24
2. The SHGC of the vertical fenestration shall be ~~less than or equal to 0.35, adjusted for projection factor in compliance with C402.4.3~~ no more than 0.90 times the maximum SHGC values listed in Table C402.4.

An area-weighted average shall be permitted to satisfy the U-factor requirement for each fenestration product category listed in Item 1 of this section. Individual fenestration products from different fenestration product categories shall not be combined in calculating the area-weighted average *U-factor*.

**Section C402.4.2 is amended to read as follows:**

**C402.4.2 Minimum skylight fenestration area.** For buildings with single story enclosed spaces greater than 2,500 square feet (232 m<sup>2</sup>) in floor area that are directly under a roof and have a ceiling height greater than 15 feet (4572 mm) for no less than 75 percent of the ceiling area; these single-story spaces shall be provided with *skylights* and *daylight responsive controls* in accordance with Section C405.2.4. Space types required to comply with this provision include office, lobby, atrium, concourse, corridor, gymnasium/exercise center, convention center, automotive service, manufacturing, nonrefrigerated warehouse, retail store, distribution/sorting area, transportation,

and workshop. Skylights in these spaces are required to provide a total toplit zone area not less than 50 percent of the floor area and shall provide one of the following:

1. A minimum ratio of skylight area to toplit *daylight zone* area of not less than 3 percent where all skylights have a VT of at least 0.40 as determined in accordance with Section C303.1.3
2. A minimum skylight effective aperture of at least 1 percent determined in accordance with Equation 4-5.

**(Equation 4-5)**

$$\text{Skylight Effective Aperture} = \frac{(0.85 \times \text{Skylight Area} \times \text{Skylight VT} \times \text{WF})}{\text{Toplit zone}}$$

Where:

Skylight area = Total fenestration area of skylights.

Skylight VT = Area weighted average visible transmittance of skylights.

WF = Area weighted average well factor, where well factor is 0.9 if light well depth is less than 2 feet (610 mm), or 0.7 if light well depth is 2 feet (610 mm) or greater, or 1.0 for *tubular daylighting devices* with *VT-annual* ratings measured according to NFRC 203.

Light well depth = Measure vertically from the underside of the lowest point of the skylight glazing to the ceiling plane under the skylight.

**Exceptions:**

1. Skylights above daylight zones of enclosed spaces are not required in:
  - 1.1. Reserved.
  - 1.2. Spaces where the designed *general lighting* power densities are less than 0.5 W/ft<sup>2</sup> (5.4 W/m<sup>2</sup>) and at least 10 percent lower than the lighting power allowance in Section C405.4.2.
  - 1.3. Areas where it is documented that existing structures or natural objects block direct beam sunlight on at least half of the roof over the enclosed area for more than 1,500 daytime hours per year between 8 a.m. and 4 p.m.
  - 1.4. Spaces where the daylight zone under rooftop monitors is greater than 50 percent of the enclosed space floor area.
  - 1.5. Spaces where the total floor area minus the sidelit zone area is less than 2,500 square feet (232 m<sup>2</sup>), and where the lighting in the daylight zone is controlled in accordance with Section ~~C405.2.3.1~~ C405.2.4
2. The skylight effective aperture, calculated in accordance with Equation 4-5, is permitted to be 0.66 percent in lieu of one percent if the *VT-annual* of the skylight or *TDD*, as measured by NFRC 203, is greater than 38 percent.

**Section C402.4.2.1 is amended to read as follows:**

**C402.4.2.1 Lighting controls in daylight zones under skylights.** *Daylight responsive controls*

complying with Section ~~C405.2.4.1~~ C405.2.4 shall be provided to control all electric lights within toplit zones.

**Section C402.5.1.1 is amended to read as follows:**

**C402.5.1.1 Air barrier construction.** The *continuous air barrier* shall be constructed to comply with the following:

1. The air barrier shall be continuous for all assemblies that are the thermal envelope of the building and across the joints and assemblies.
2. Air barrier joints and seams shall be sealed, including sealing transitions in places and changes in materials. The joints and seals shall be securely installed in or on the joint for its entire length so as not to dislodge, loosen or otherwise impair its ability to resist positive and negative pressure from wind, stack effect and mechanical ventilation.
3. Penetrations of the air barrier shall be caulked, gasketed or otherwise sealed in a manner compatible with the construction materials and location. Sealing shall allow for expansion, contraction and mechanical vibration. Joints and seams associated with penetrations shall be sealed in the same manner or taped. Sealing materials shall be securely installed around the penetrations so as not to dislodge, loosen or otherwise impair the penetrations' ability to resist positive and negative pressure from wind, stack effect, and mechanical ventilation. Sealing of concealed fire sprinklers, where required, shall be in a manner that is recommended by the manufacturer. Caulking or other adhesive sealants shall not be used to fill voids between fire sprinkler cover plates and walls or ceilings.
4. Recessed lighting fixtures shall comply with Section C402.5.8. Where similar objects are installed which penetrate the air barrier, provisions shall be made to maintain the integrity of the air barrier.
5. Construction documents shall contain a diagram showing the building's pressure boundary in plan(s) and section(s) and a calculation of the area of the pressure boundary to be considered in the test.

**City Informative Note:** The continuous air barrier is intended to control the air leakage into and out of the *conditioned space*. The definition of *conditioned space* includes semi-heated spaces, so these spaces are included when detailing the continuous air barrier and when determining the pressure boundary for conducting the air leakage test. However, unheated spaces are not included when determining the pressure boundary.

**Section C402.5.1.2 is amended to read as follows:**

**C402.5.1.2 Building test.** The completed building shall be tested and the air leakage rate of the *building envelope* shall not exceed 0.25 cfm/ft<sup>2</sup> at a pressure differential of 0.3 inches water gauge (~~2.0~~ 1.27 L/s x m<sup>2</sup> at 75 Pa) at the upper 95 percent confidence interval in accordance with ASTM E 779 or an equivalent method approved by the *code official*. A report that includes the tested surface area, floor area, air by volume, stories above grade, and leakage rates shall be submitted to the building owner and the *code official*. If the tested rate exceeds that defined here by up to 0.15 cfm/ft<sup>2</sup>, a visual inspection of the air barrier shall be conducted and any leaks noted shall be sealed to the extent practicable. An additional report identifying the corrective actions taken to seal air leaks shall be submitted to the building owner and the Code Official and any further requirement to

meet the leakage air rate will be waived. If the tested rate exceeds 0.40 cfm/ft<sup>2</sup>, corrective actions must be made and the test completed again. A test above 0.40 cfm/ft<sup>2</sup> will not be accepted.

1. Test shall be accomplished using either (1) both pressurization and depressurization or (2) pressurization alone, but not depressurization alone. The test results shall be plotted against the correct P for pressurization in accordance with Section 9.4 of ASTM E779.
2. The test pressure range shall be from 25 Pa to 80 Pa per Section 8.10 of ASTM E779, but the upper limit shall not be less than 50 Pa, and the difference between the upper and lower limit shall not be less than 25 Pa.
3. If the pressure exponent  $n$  is less than 0.45 or greater than 0.85 per Section 9.6.4 of ASTM E779, the test shall be rerun with additional readings over a longer time interval.

**Section C402.5.7 is amended to read as follows:**

**C402.5.7 Vestibules.** All building entrances shall be protected with an enclosed vestibule, with all doors opening into and out of the vestibule equipped with self-closing devices. Vestibules shall be designed so that in passing through the vestibule it is not necessary for the interior and exterior doors to open at the same time. The installation of one or more revolving doors in the building entrance shall not eliminate the requirement that a vestibule be provided on any doors adjacent to revolving doors. For the purposes of this section, "building entrances" shall include exit-only doors in buildings where separate doors for entering and exiting are provided.

Interior and exterior doors shall have a minimum distance between them of not less than 7 feet. The exterior envelope of conditioned vestibules shall comply with the requirements for a conditioned space. Either the interior or exterior envelope of unconditioned vestibules shall comply with the requirements for a conditioned space. The building lobby is not considered a vestibule.

**Exception:** Vestibules are not required for the following:

1. Doors not intended to be used as building entrances.
2. Unfinished ground-level space greater than 3,000 square feet (298 m<sup>2</sup>) if a note is included on the permit documents at each exterior entrance to the space stating "Vestibule required at time of tenant build-out if entrance serves a space greater than 3,000 square feet in area."
3. Doors opening directly from a *sleeping unit* or dwelling unit.
4. Doors between an enclosed space smaller than 3,000 square feet (298 m<sup>2</sup>) in area and the exterior of the building or the building entrance lobby, where those doors do not comprise one of the primary building entrance paths to the remainder of the building. The space must be enclosed and separated without transfer air paths from the primary building entrance paths. If there are doors between the space and the primary entrance path then the doors shall be equipped with self-closing devices so the space acts as a vestibule for the primary building entrance.
5. Revolving doors.
6. Doors used primarily to facilitate vehicular movement or material handling and adjacent personnel doors.
7. In buildings less than three stories above grade or in spaces that do not directly connect with the building elevator lobby, doors that have an air curtain with a velocity of not less than 6.56 feet per second (2 m/s) at the floor that have been tested in accordance with ANSI/AMCA 220 and installed in accordance with the manufacturer's instructions. *Manual*

- or *automatic* controls shall be provided that will operate the air curtain with the opening and closing of the door. Air curtains and their controls shall comply with Section C408.2.3
8. Building entrances in buildings that are less than four stories above grade and less than 10,000 square feet in area.
  9. Elevator doors in parking garages provided that the elevators have an enclosed lobby at each level of the garage.
  10. Entrances to semi-heated spaces.
  11. Doors that are used only to access outdoor seating areas that are separated from adjacent walking areas by a fence or other barrier.

**City Informative Note:** Building entrance is defined as the means ordinarily used to gain access to the building. Doors other than building entrances, such as those leading to service areas, mechanical rooms, electrical equipment rooms, outdoor seating areas or exits from fire stairways, are not covered by this requirement. There is less traffic through these doors, and the vestibule may limit access for large equipment. Note that enclosed lobbies in parking garages also serve to reduce the flow of vehicle exhaust into the building.

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## SECTION C403 MECHANICAL SYSTEMS

### Section 403.1.1 is amended to read as follows:

**C403.1.1 HVAC total system performance ratio (HVAC TSPR).** For systems serving office, retail, library and education occupancies and buildings, and the dwelling units and residential common areas within R-2 multifamily buildings, which are subject to the requirements of Section C403.3.5 without exceptions, the *HVAC total system performance ratio (HVAC TSPR)* of the *proposed design* HVAC system shall be more than or equal to the *HVAC TSPR* of the *standard reference design* as calculated according to Appendix D, Calculation of HVAC Total System Performance Ratio.

#### **Exceptions:**

1. Buildings with *conditioned floor area* less than 5,000 square feet.
2. HVAC systems using district heating water, chilled water or steam.
3. HVAC systems not included in Table D601.11.1.
4. HVAC systems with chilled water supplied by absorption chillers, heat recovery chillers, water to water heat pumps, air to water heat pumps, or a combination of air and water cooled chillers on the same chilled water loop- with no more than 10 percent of the cooling capacity of the combination being supplied by air cooled chillers.
5. HVAC system served by heating water plants that include air to water or water to water heat pumps.
6. Underfloor air distribution HVAC systems.
7. Space conditioning systems that do not include *mechanical cooling*.
8. Alterations to existing buildings that do not substantially replace the entire HVAC system.
9. HVAC systems meeting all the requirements of the *standard reference design* HVAC system in Table D602.11, Standard Reference Design HVAC Systems.
10. HVAC systems serving laundry rooms, elevator rooms, mechanical rooms, electrical rooms, data centers, computer rooms, and kitchens.
11. Buildings or areas of medical office buildings that comply fully with ASHRAE Standard 170,

including but not limited to surgical centers, or that are required by other applicable codes or standards to provide 24/7 air handling unit operation.

**Section C403.1.3 is amended to read as follows:**

**C403.1.3 Data centers.** *Data center systems* shall comply with Sections 6 and 8 of ASHRAE Standard 90.4 (2019), with the following changes:

- ~~1. Replace design MLC in ASHRAE Standard 90.4 Table 6.2.1.1 “Maximum Design Mechanical Load Component (Design MLC)” with the following per applicable climate zone:  
Zone 4C Design MLC = 0.22 Zone 5B Design MLC = 0.24~~
- ~~2. Replace annualized MLC values of Table 6.2.1.2 “Maximum Annualized Mechanical Load Component (Annualized MLC)” in ASHRAE Standard 90.4 with the following per applicable climate zone:  
Zone 4C Annual MLC = 0.18 Zone 5B Annual MLC = 0.17~~

**A new section, Section C403.1.4 is added and shall read as follows:**

**C403.1.4 Use of electric resistance and fossil fuel-fired HVAC heating equipment.** HVAC heating energy shall not be provided by electric resistance or fossil fuel combustion appliances. For the purposes of this section, electric resistance HVAC heating appliances include but are not limited to electric baseboard, electric resistance fan coil and VAV electric resistance terminal reheat units and electric resistance boilers. For the purposes of this section, fossil fuel combustion HVAC heating appliances include but are not limited to appliances burning natural gas, heating oil, propane, or other fossil fuels.

**Exceptions:**

- 1. Low heating capacity.** Buildings or areas of buildings, other than *dwelling units* or sleeping units, that meet the interior temperature requirements of IBC Chapter 12 with a total installed HVAC heating capacity no greater than 8.5 BTU/h (2.5 watts) per square foot of *conditioned space* are permitted to be heated using electric resistance appliances. For the purposes of this exception, overhead or wall-mounted radiant heating panels installed in an unheated or semi-heated space, insulated in compliance with Section C402.2.8 and controlled by occupant sensing devices in compliance with Section C403.11.1 need not be included as part of the HVAC heating energy calculation.
- 2. Dwelling and sleeping units.** Dwelling or sleeping units having an installed HVAC heating capacity no greater than 750 watts in any separate habitable room with exterior fenestration are permitted to be heated using electric resistance appliances.
  - a. Corner rooms.** A room within a dwelling or sleeping unit that has two primary walls facing different cardinal directions, each with exterior fenestration, is permitted to have an installed HVAC heating capacity no greater than 1000 watts. Bay windows and other minor offsets are not considered primary walls.
- 3. Small buildings.** Buildings with less than 2,500 square feet of *conditioned floor area* are permitted to be heated using electric resistance appliances.
- 4. Defrost.** Heat pumps are permitted to utilize electric resistance as the first stage of heating when a heat pump defrost cycle is required and is in operation.
- 5. Air-to-air heat pumps.** Buildings are permitted to utilize internal electric resistance heaters to supplement heat pump heating for air-to-air heat pumps that meet all of the following



conditions:

- a. Internal electric resistance heaters have controls that prevent supplemental heater operation when the heating load can be met by the heat pump alone during both steady-state operation and setback recovery.
  - b. The heat pump controls are configured to use the compressor as the first stage of heating down to an outdoor air temperature of 17°F or lower.
  - c. The heat pump complies with one of the following:
    1. Controlled by a digital or electronic thermostat designed for heat pump use that energizes the supplemental heat only when the heat pump has insufficient capacity to maintain set point or to warm up the space at a sufficient rate.
    2. Controlled by a multistage space thermostat and an outdoor air thermostat wired to energize supplemental heat only on the last stage of the space thermostat and when outdoor air temperature is less than 32°F.
    3. The minimum efficiency of the heat pump is regulated by NAECA, its rating meets the requirements shown in Table C403.3.2(2), and its rating includes all usage of internal electric resistance heating.
  - d. The heat pump rated heating capacity is sized to meet the heating load at an outdoor air temperature of 32°F or lower and has a rated heating capacity at 47°F no less than 2 times greater than supplemental internal electric resistance heating capacity, or utilizes the smallest available factory-available internal electric resistance heater.
- 6. Air-to-water heat pumps, up to 2,000 MBH.** Buildings are permitted to utilize electric resistance auxiliary heating to supplement heat pump heating for hydronic heating systems that have air-to-water heat pump heating capacity no greater than 2000 kBTU/hr at 47°F, and that meet all of the following conditions:
- a. Controls for the auxiliary electric resistance heating are configured to lock out the supplemental heat when the outside air temperature is above 32°F, unless the hot water supply temperature setpoint to the building heat coils cannot be maintained for 20 minutes.
  - b. The heat pump controls are configured to use the compressor as the first stage of heating down to an outdoor air temperature of 17°F or lower except during startup or defrost operation.
  - c. The heat pump rated heating capacity at 47°F is no less than 2 times greater than supplemental electric resistance heating capacity.
- 7. Air-to-water heat pumps, up to 3,000 MBH.** Buildings are permitted to utilize electric resistance auxiliary heating to supplement heat pump heating for hydronic heating systems that have air-to-water heat pump heating capacity greater than 2000 KBTU/hr and no greater than 3000 kBTU/hr at 47°F, and that meet all of the following conditions:
- a. Controls for the auxiliary electric resistance heating are configured to **lock out the supplemental heat when the outside air temperature is above 36°F**, unless the hot water supply temperature setpoint to the building heat coils cannot be maintained for 20 minutes.
  - b. The heat pump controls are configured to use the compressor as the first stage of heating down to an outdoor air temperature of 17°F or lower except during startup or defrost operation.
  - c. The heat pump rated heating capacity at 47°F is no less than 1.75 times greater than supplemental electric resistance heating capacity.
- 8. Air-to-water heat pumps, over 3,000 MBH.** Buildings are permitted to utilize electric resistance auxiliary heating to supplement heat pump heating for hydronic heating systems that have air-to-water heat pump heating capacity greater than 3000 kBTU/hr at 47°F and that meet all of the following conditions:
- a. Controls for the auxiliary resistance heating are configured to **lock out the supplemental**

- heat when the outside air temperature is above 40°F unless the hot water supply temperature setpoint to the building heat coils cannot be maintained for 20 minutes.
- b. The heat pump controls are configured to use the compressor as the first stage of heating down to an outdoor air temperature of 17°F or lower except during startup or defrost operation.
  - c. The heat pump rated heating capacity at 47°F is no less than 1.5 times greater than supplemental electric resistance heating capacity.
9. **Ground source heat pumps.** Buildings are permitted to utilize electric resistance auxiliary heating to supplement heat pump heating for hydronic heating systems with ground source heat pump equipment that meets all of the following conditions:
- a. Controls for the auxiliary resistance heating are configured to lock out the supplemental heat when the outdoor air temperature is above 32°F, unless the hot water supply temperature setpoint to the building heat coils cannot be maintained for 20 minutes.
  - b. The heat pump controls are configured to use the compressor as the first stage of heating down to an outdoor temperature of 17°F or lower.
  - c. The heat pump rated heating capacity at 32°F entering water conditions is no less than 2 times greater than supplemental electric resistance heating capacity.
10. **Small systems.** Buildings in which electric resistance or fossil fuel appliances, including decorative appliances, either provide less than 5 percent of the total building HVAC system heating capacity or serve less than 5 percent of the conditioned floor area.
11. **Specific conditions.** Portions of buildings that require fossil fuel or electric resistance space heating for specific conditions approved by the code official for research, health care, process or other specific needs that cannot practicably be served by heat pump or other space heating systems. This does not constitute a blanket exception for any occupancy type.
12. **Kitchen exhaust.** Make-up air for commercial kitchen exhaust systems required to be tempered by Section 508.1.1 of the International Mechanical Code is permitted to be heated using electric resistance appliances.
13. **District energy.** Steam or hot water district energy systems that utilize fossil fuels as their primary source of heat energy, that serve multiple buildings, and that were already in existence prior to the effective date of this code, including more energy-efficient upgrades to such existing systems, are permitted to serve as the primary heating energy source.
14. **Heat tape.** Heat tape is permitted where it protects water-filled equipment and piping located outside of the building thermal envelope, provided that it is configured and controlled to be automatically turned off when the outside air temperature is above 40°F.
15. **Temporary systems.** Temporary electric resistance heating systems are permitted where serving future tenant spaces that are unfinished and unoccupied, provided that the heating equipment is sized and controlled to achieve interior space temperatures no higher than 40°F.
16. **Emergency generators.** Emergency generators are permitted to use fossil fuels.
17. **Pasteurization.** Electric resistance heat controls are permitted to reset the supply water temperature of hydronic heating systems that serve service water heating heat exchangers during pasteurization cycles of the service hot water storage volume. The hydronic heating system supply water temperature shall be configured to be 145°F or lower during the pasteurization cycle.

**Section C403.2.1 is amended to read as follows:**

**C403.2.1 Zone isolation required.** HVAC systems serving zones areas that are intended to

operate or be occupied nonsimultaneously shall be divided into isolation areas. *Zones* may be grouped into a single isolation area provided it does not exceed 25,000 square feet (2323 m<sup>2</sup>) of *conditioned floor area* nor include more than one floor. Each isolation area shall be equipped with isolation devices and controls configured to automatically shut off the supply of conditioned air and outdoor air to and exhaust air from the isolation area. Each isolation area shall be controlled independently by a device meeting the requirements of Section C403.4.2.2. Central systems and plants shall be provided with controls and devices that will allow system and equipment operation for any length of time while serving only the smallest isolation area served by the system or plant.

**Exceptions:**

1. Exhaust air and outdoor air connections to isolation areas where the fan system to which they connect is not greater than 5,000 cfm (2360 L/s).
2. Exhaust airflow from a single isolation area of less than 10 percent of the design airflow of the exhaust system to which it connects.
3. Isolation areas intended to operate continuously or intended to be inoperative only when all other isolation areas in a *zone* are inoperative.

**Section C403.2.3 is amended to read as follows:**

**C403.2.3 Variable flow capacity.** For fan and pump motors ~~7.5~~ 5 hp and greater including motors in or serving custom and packaged air handlers serving variable air volume fan systems, constant volume fans, parking garaged ventilation fans, heating and cooling hydronic pumping systems, pool and service water pumping systems, domestic water pressure-booster systems, cooling tower fan, and other pump or fan motors where variable flows are required, there shall be:

1. Variable speed drives; or
2. Other controls and devices that will result in fan and pump motor demand of no more than 30 percent of design wattage at 50 percent of design air volume for fans when static pressure set point equals 1/3 the total design static pressure, and 50 percent of design water flow for pumps, based on manufacturer's certified test data. Variable inlet vanes, throttling valves (dampers), scroll dampers or bypass circuits shall not be allowed.

**Exception:** Variable speed devices are not required for motors that serve:

1. Fans or pumps in packaged equipment where variable speed drives are not available as a factory option from the equipment manufacturer.
2. Fans or pumps that are required to operate only for emergency fire-life-safety events (e.g., stairwell pressurization fans, elevator pressurization fans, fire pumps, etc.).

**Section 403.3.2 is amended to read as follows:**

**C403.3.2 HVAC equipment performance requirements.** Equipment shall meet the minimum efficiency requirements of Tables C403.3.2(1) through ~~C403.3.2(12)~~ C4-3/3/2(13) when tested and rated in accordance with the applicable test procedure. Plate-type liquid-to-liquid heat exchangers shall meet the minimum requirements of Table C403.3.2(10). The efficiency shall be verified through certification and listed under an *approved* certification program or, if no certification program exists, the equipment efficiency ratings shall be supported by data furnished by the manufacturer. Where multiple rating conditions or performance requirements are provided, the equipment shall satisfy all stated requirements. Where components, such as indoor or outdoor coils,

from different manufacturers are used, calculations and supporting data shall be furnished by the designer that demonstrates that the combined efficiency of the specified components meets the requirements herein.

Gas-fired and oil-fired forced air furnaces with input ratings of 225,000 Btu/h (65 kW) or greater and all unit heaters shall also have an intermittent ignition or interrupted device (IID), and have either mechanical draft (including power venting) or a flue damper. A vent damper is an acceptable alternative to a flue damper for furnaces where combustion air is drawn from the conditioned space. All furnaces with input ratings of 225,000 Btu/h (65 kW) or greater, including electric furnaces, that are not located within the conditioned space shall have jacket losses not exceeding 0.75 percent of the input rating.

Air-to-water heat pump manufacturers shall report the hourly heating output or heating efficiency with and without defrost operation at 32°F, in addition to meeting the efficiency requirements of Table C403.3.2(13) at the AHRI 550/590 applicable leaving water temperatures. The hourly heating output or heating efficiency with and without defrost operation shall be documented on the mechanical permit drawings.

**Exception:**

Heat recovery chillers and air-to-water heat pumps covered under Table C403.3.2(13), are not required to be listed in the AHRI certification program for AHRI 550/590. The equipment heating and cooling efficiency ratings shall be supported by data furnished by the manufacturer at AHRI 550/590 conditions. Where multiple rating conditions or performance requirements are provided, the equipment shall satisfy all stated requirements.

**City Informative Note:** Table C403.3.2.(13) is from ASHRAE 90.1-2019. At the time of the adoption of the 2018 SEC there were no air-to-water heat pumps or heat recovery chillers listed in the AHRI Certified Product Directory. <https://www.ahridirectory.org/> According to AHRI 550/590 Section 5.3, "Full and part-load application ratings shall include the range of Rating Conditions listed in Table 2 or be within the operating limits of the equipment."

**Section C403.3.2.1 is amended to read as follows:**

**C403.3.2.1 Chillers.** Chilled water plants and buildings with more than 500 tons total capacity shall not have more than 100 tons provided by air-cooled chillers.

**Exceptions:**

1. Where the designer demonstrates that the water quality at the building site fails to meet manufacturer's specifications for the use of water-cooled equipment.
2. Air-cooled chillers with minimum efficiencies at least 10 percent higher than those listed in Table C403.3.2(7).
3. Replacement of existing air-cooled chiller equipment.
4. Air-to-water heat pump units that are configured to provide both heating and cooling and that are rated in accordance with AHRI 550/590. ~~Where the air-to-water heat pumps are designed for a maximum supply leaving water temperature of less than 140°F, the efficiency rating will be calculated and reported at the maximum unit leaving water temperature for this test condition.~~

**Table C403.3.2(1)B is amended to read as follows:**

**TABLE C403.3.2(1)B  
 MINIMUM EFFICIENCY REQUIREMENTS:  
 ELECTRICALLY OPERATED VARIABLE REFRIGERANT FLOW AIR CONDITIONERS**

Equipment Type	Size Category	Heating Section Type	Sub-Category or Rating Condition	Minimum Efficiency	Test Procedure
VRF Air Conditioners, Air Cooled	<65,000 Btu/h	All	VRF Multi-split System	13.0 SEER	AHRI 1230
	≥65,000 Btu/h and <135,000 Btu/h	Electric Resistance (or none)	VRF Multi-split System	11.2 EER 15.5 IEER	
	≥135,000 Btu/h and <240,000 Btu/h	Electric Resistance (or none)	VRF Multi-split System	11.0 EER 14.9 IEER	
	≥240,000 Btu/h	Electric Resistance (or none)	VRF Multi-split System	10.0 EER <del>13.9 EER</del> 13.9 IEER	

**Table C403.3.2(7) is amended to read as follows:**

**TABLE C403.3.2(7)  
 MINIMUM EFFICIENCY REQUIREMENTS: WATER CHILLING PACKAGES<sup>a, b</sup>**

EQUIPMENT TYPE	SIZE CATEGORY	UNITS	PATH A		PATH B		TEST PROCEDURE <sup>c</sup>
			FULL LOAD	IPLV	FULL LOAD	IPLV	
Air-cooled chillers	< 150 tons	EER	≥ 10.100	≥ 13.700	≥ 9.700	≥ 15.800	AHRI 550/590
	≥ 150 tons	EER	≥ 10.100	≥ 14.000	≥ 9.700	≥ 16.100	
Air cooled without condenser, electrical operated	All capacities	EER	Air-cooled chillers without condensers shall be rated with matching condensers and comply with the air-cooled chiller efficiency requirements				
Water cooled, electrically operated, positive displacement	< 75 tons	kW/ton	≤ 0.750	≤ 0.600	≤ 0.780	≤ 0.500	
	≥ 75 tons and < 150 tons	kW/ton	≤ 0.720	≤ 0.560	≤ 0.750	≤ 0.490	
	≥ 150 tons and < 300 tons	kW/ton	≤ 0.660	≤ 0.540	≤ 0.680	≤ 0.440	
	≥ 300 tons and < 600 tons	kW/ton	≤ 0.610	≤ 0.520	≤ 0.625	≤ 0.410	
	≥ 600 tons	kW/ton	≤ 0.560	≤ 0.500	≤ 0.585	≤ 0.380	
Water cooled, electrically operated, centrifugal	< 150 tons	kW/ton	≤ 0.610	≤ 0.550	≤ 0.695	≤ 0.440	
	≥ 150 tons and < 300 tons	kW/ton	≤ 0.610	≤ 0.550	≤ 0.695	≤ 0.400	
	≥ 300 tons and < 400 tons	kW/ton	≤ 0.560	≤ 0.520	≤ 0.595	≤ 0.390	
	≥ 400 tons	kW/ton	≤ 0.560	≤ 0.500	≤ 0.585	≤ 0.380	
Air cooled, absorption single effect	All capacities	COP	≥ 0.600	NR	NA	NA	AHRI 560
Water cooled, absorption single effect	All capacities	COP	≥ 0.700	NR	NA	NA	
Absorption double effect, indirect fired	All capacities	COP	≥ 1.000	≥ 1.050	NA	NA	

Absorption double effect, direct fired	All capacities	COP	≥ 1.000	≥ 1.000	NA	NA	
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Keys for Table C403.3.2(7)

For SI: 1 ton = 3517 W, 1 British thermal unit per hour = 0.2931 W, °C = [(°F) - 32]/1.8.

NA = Not applicable, not to be used for compliance; NR = No requirement.

Footnotes for Table C403.2.3(7)

- a. ~~The centrifugal chiller equipment requirements, after adjustment in accordance with Section C403.3.2.2 or Section C403.3.2.3, do not apply to chillers used in low-temperature applications where the design leaving fluid temperature is less than 36°F. The requirements do not apply to positive displacement chillers with leaving fluid temperatures less than or equal to 32°F. The requirements do not apply to absorption chillers with design leaving fluid temperatures less than 40°F. The requirements for air-cooled, water-cooled positive displacement, and absorption chillers are at standard rating conditions defined in the reference test procedure. The requirements for centrifugal chillers shall be adjusted for nonstandard rating conditions per Section C403.2.3.1 and are only applicable for the range of conditions listed there.~~
- b. Compliance with this standard can be obtained by meeting the minimum requirements of Path A or B. However, both the full load and IPLV shall be met to fulfill the requirements of Path A or B.
- c. Chapter 12 of the referenced standard contains a complete specification of the referenced test procedure, including the referenced year version of the test procedure.

**A new table, Table C403.3.2(13) is added and reads as follows:**

**Table C403.3.2(13) f, g, h, i**  
**HEAT PUMP AND HEAT RECOVERY CHILLER PACKAGES – MINIMUM EFFICIENCY REQUIREMENTS**

<u>Equipment Type</u>	<u>Size Category</u> (tons <sup>R</sup> )	<u>Cooling only Operation</u> <u>Cooling Efficiency<sup>a</sup></u>  (Air EER FL/IPLV-Btu/W-h)	<u>Heating Operation</u>		<u>Test Procedure</u>
			<u>Heating Source Conditions</u>	<u>Heat Pump Heating Full Load Efficiency</u> (COP <sub>H</sub> ) <sup>b</sup> (W/W)	

		Water Source Power Input per Capacity FL/IPLV-(kW/ton <sup>R</sup> )		(Entering/leaving water) or OAT (db/wb) °F					Simultaneous Cooling and Heating Full Load Efficiency (COP <sub>SHC</sub> ) <sup>b</sup> , (W/W)						
					Leaving Heating Water Temperature				Leaving Heating Water Temperature						
					Low	Medium	High	Boost	Low	Medium	High	Boost			
					105°F	120°F	140°F	140°F	105°F	120°F	140°F	140°F			
		Path A	Path B												
Air Source	All sizes	$\geq 9.595$ FL $\geq 13.02$ IPLV.IP	$\geq 9.215$ FL $\geq 15.01$ IPLV.IP	47 db 43 wb <sup>d</sup>	$\geq 3.290$	$\geq 2.770$	$\geq 2.310$	NA	NA	NA	NA	NA	AHRI 550/590		
		$\geq 9.595$ FL $\geq 13.30$ IPLV.IP	$\geq 9.215$ FL $\geq 15.30$ IPLV.IP	17 db 15 wb <sup>d</sup>	$\geq 2.230$	$\geq 1.950$	$\geq 1.630$	NA	NA	NA	NA	NA			
Water Source electrically operated positive displacement	< 75	$\leq 0.7885$ FL	$\leq 0.7875$ FL	54/44°	$\geq 4.640$	$\geq 3.680$	$\geq 2.680$	NA	$\geq 8.330$	$\geq 6.410$	$\geq 4.420$	NA	AHRI 550/590		
		$\leq 0.6316$ IPLV.IP	$\leq 0.5145$ IPLV.IP	75/65°	NA	NA	NA	$\geq 3.550$	NA	NA	NA	6.150			
	$\geq 75$ and < 150	$\leq 0.7579$ FL	$\leq 0.7140$ FL	54/44°	$\geq 4.640$	$\geq 3.680$	$\geq 2.680$	NA	$\geq 8.330$	$\geq 6.410$	$\geq 4.420$	NA			
		$\leq 0.5895$ IPLV.IP	$\leq 0.4620$ IPLV.IP	75/65°	NA	NA	NA	$\geq 3.550$	NA	NA	NA	6.150			
	$\geq 150$ and < 300	$\leq 0.6947$ FL	$\leq 0.7140$ FL	54/44°	$\geq 4.640$	$\geq 3.680$	$\geq 2.680$	NA	$\geq 8.330$	$\geq 6.410$	$\geq 4.420$	NA			
		$\leq 0.5684$ IPLV.IP	$\leq 0.4620$ IPLV.IP	75/65°	NA	NA	NA	$\geq 3.550$	NA	NA	NA	6.150			
	$\geq 300$ and < 600	$\leq 0.6421$ FL	$\leq 0.6563$ FL	54/44°	$\geq 4.930$	$\geq 3.960$	$\geq 2.970$	NA	$\geq 8.900$	$\geq 6.980$	$\geq 5.000$	NA			
		$\leq 0.5474$ IPLV.IP	$\leq 0.4305$ IPLV.IP	75/65°	NA	NA	NA	$\geq 3.900$	NA	NA	NA	6.850			
	$\geq 600$	$\leq 0.5895$ FL	$\leq 0.6143$ FL	54/44°	$\geq 4.930$	$\geq 3.960$	$\geq 2.970$	NA	$\geq 8.900$	$\geq 6.980$	$\geq 5.000$	NA			
		$\leq 0.5263$ IPLV.IP	$\leq 0.3990$ IPLV.IP	75/65°	NA	NA	NA	$\geq 3.900$	NA	NA	NA	6.850			
	Water source electrically operated centrifugal	< 75	$\leq 0.6421$ FL	$\leq 0.7316$ FL	54/44°	$\geq 4.640$	$\geq 3.680$	$\geq 2.680$	NA	$\geq 8.330$	$\geq 6.410$	$\geq 4.420$		NA	AHRI 550/590
			$\leq 0.5789$ IPLV.IP	$\leq 0.4632$ IPLV.IP	75/65°	NA	NA	NA	$\geq 3.550$	NA	NA	NA		6.150	
$\geq 75$ and < 150		$\leq 0.5895$ FL	$\leq 0.6684$ FL	54/44°	$\geq 4.640$	$\geq 3.680$	$\geq 2.680$	NA	$\geq 8.330$	$\geq 6.410$	$\geq 4.420$	NA			
		$\leq 0.5474$ IPLV.IP	$\leq 0.4211$ IPLV.IP	75/65°	NA	NA	NA	$\geq 3.550$	NA	NA	NA	6.150			
$\geq 150$ and < 300		$\leq 0.5895$ FL	$\leq 0.6263$ FL	54/44°	$\geq 4.640$	$\geq 3.680$	$\geq 2.680$	NA	$\geq 8.330$	$\geq 6.410$	$\geq 4.420$	NA			
		$\leq 0.5263$ IPLV.IP	$\leq 0.4105$ IPLV.IP	75/65°	NA	NA	NA	$\geq 3.550$	NA	NA	NA	6.150			
$\geq 300$ and < 600		$\leq 0.5895$ FL	$\leq 0.6158$ FL	54/44°	$\geq 4.930$	$\geq 3.960$	$\geq 2.970$	NA	$\geq 8.900$	$\geq 6.980$	$\geq 5.000$	NA			
		$\leq 0.5263$ IPLV.IP	$\leq 0.4000$ IPLV.IP	75/65°	NA	NA	NA	$\geq 3.900$	NA	NA	NA	6.850			
$\geq 600$		$\leq 0.5895$ FL	$\leq 0.6158$ FL	54/44°	$\geq 4.930$	$\geq 3.960$	$\geq 2.970$	NA	$\geq 8.900$	$\geq 6.980$	$\geq 5.000$	NA			
		$\leq 0.5263$ IPLV.IP	$\leq 0.4000$ IPLV.IP	75/65°	NA	NA	NA	$\geq 3.900$	NA	NA	NA	6.850			

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Footnotes:

- a. Cooling-only rating conditions are standard rating conditions defined in AHRI 550/590, Table 1.
- b. Heating full-load rating conditions are at rating conditions defined in AHRI 550/590, Table 1.
- c. For water-cooled heat recovery chillers that have capabilities for heat rejection to a heat recovery condenser and a tower condenser, the COP<sub>HR</sub> applies to operation at full load with 100% heat recovery (no tower rejection). Units that only have capabilities for partial heat recovery shall meet the requirements of Table 6.8.1-3
- d. Outdoor air entering dry-bulb (db) temperature and wet-bulb (wb) temperature.
- e. Source-water entering and leaving water temperature.
- f. AHRI ratings are not required for equipment sizes larger than those covered by the test standard.

- g. Air-to-water heat pumps that are configured to operate only in heating and not in cooling only need to comply with the minimum heating efficiencies.
- h. Units that are both an air-to-water heat pump and an heat recovery chiller are required to comply with either the applicable air source efficiency requirements or the heat recovery chiller requirements but not both.
- i. Heat pumps and heat recovery chillers are only required to comply with one of the four leaving heating water temperature criteria. The leaving heater water temperature criteria that is closest to the design leaving water temperature shall be utilized.

**Section 403.3.2.2 is amended to read as follows:**

**C403.3.2.2 Water-cooled centrifugal chilling package.** Equipment not designed for operation at AHRI Standard 550/590 test conditions of 44°F (7°C) leaving chilled-water temperature and 2.4 gpm/ton evaporator fluid flow and 85°F (29°C) entering condenser water temperature with 3 gpm/ton (0.054 L/s x kW) condenser water flow shall have maximum full-load kW/ton (*FL*) and part-load ratings adjusted using Equations 4-7 and 4-8.

**Exception:** Centrifugal chillers designed to operate outside of these temperature ranges are not regulated by this section.

$$FL_{adj} = FL/K_{adj} \quad \text{(Equation 4-7)}$$

$$PLV_{adj} = IPLV/K_{adj} \quad \text{(EquATION 4-8)}$$

Where:

$$K_{adj} = A \times B$$

FL = Full-load kW/ton values as specified in Table C403.3.2(7)

FL<sub>adj</sub> = Maximum full-load kW/ton rating, adjusted for nonstandard conditions

IPLV = Values as specified in Table C403.3.2(7)

PLV<sub>adj</sub> = Maximum NPLV rating, adjusted for nonstandard conditions.

$$A = 0.00000014592 \times (\text{LIFT})^4 - 0.0000346496 \times (\text{LIFT})^3 + 0.00314196 \times (\text{LIFT})^2 - 0.147199 \times \text{LIFT} + 3.9302$$

$$B = 0.0015 \times L_{vg}^{Evap} (\text{°F}) + 0.934$$

$$\text{LIFT} = L_{vg}^{Cond} - L_{vg}^{Evap}$$

$L_{vg}^{Cond}$  = Full-load condenser leaving fluid temperature (°F)

$L_{vg}^{Evap}$  = Full-load evaporator leaving temperature (°F)

The FL<sub>adj</sub> and PLV<sub>adj</sub> values are only applicable for centrifugal chillers meeting all of the following full-load design ranges:

1. Minimum evaporator leaving temperature: 36°F.
2. Maximum condenser leaving temperature: 115°F.
3. LIFT is not less than 20°F and not greater than 80°F.

**Section C403.3.2.4 is amended to read as follows:**

**C403.3.2.4 Packaged and split system electric heating and cooling equipment.** Packaged and split system electric equipment providing both heating and cooling, and cooling-only equipment with electric heat in the main supply duct before VAV boxes, in each case with a total cooling capacity



greater than 6,000 Btu/h shall be a heat pump.

**Exception:** Unstaffed equipment shelters or cabinets used solely for personal wireless service facilities.

**Section C403.3.5 is amended to read as follows:**

**C403.3.5 Dedicated outdoor air systems (DOAS).** For buildings with occupancies as shown in Table C403.3.5, outdoor air shall be provided to each occupied space by a dedicated outdoor air system (DOAS) which delivers 100 percent outdoor air without requiring operation of the heating and cooling system fans for ventilation air delivery.

**Exceptions:**

1. Occupied spaces that are not ventilated by a mechanical ventilation system and are only ventilated by a natural ventilation system in accordance with Section 402 of the *International Mechanical Code*.
2. High efficiency variable air volume (VAV) systems complying with Section C403.6.10 for occupancy classifications other than Groups A-1, A-2 and A-3 as specified in Table C403.3.5, and high efficiency VAV systems complying with Section C403.12 for occupancy classifications Groups A-1, A-2 and A-3 as specified in Table C403.3.5. This exception shall not be used as a substitution for a DOAS per Section C406.6.
3. Spaces that are within building types not subject to the requirements of Section C403.3.5, and that qualify as accessory occupancies according to Section 508.2 of the International Building Code, are not required to comply with this section.

**Section C403.3.5.1 is amended to read as follows:**

**C403.3.5.1 Energy recovery ventilation with DOAS.** The DOAS shall include *energy recovery ventilation*. The energy recovery system shall have a ~~60 percent minimum sensible recovery effectiveness or have 50~~ 60 percent enthalpy recovery effectiveness in accordance with Section C403.7.6. For DOAS having a total fan system motor nameplate hp less than 5 hp, total combined fan power shall not exceed 1 W/cfm of outdoor air. For DOAS having a total fan system motor hp greater than or equal to 5 hp, refer to fan power limitations of Section C403.8.1. This fan power restriction applies to each dedicated outdoor air unit in the permitted project, but does not include the fan power associated with the zonal heating/cooling equipment. The airflow rate thresholds for energy recovery requirements in Tables C403.7.6(1) and C403.7.6(2) do not apply.

**Exceptions:**

1. Occupied spaces with all of the following characteristics:
  - a. Complying with Section C403.7.6;
  - b. Served by equipment less than 5000 cfm;
  - c. With an average occupant load ~~greater than 25~~ 15 people or greater per 1000 square feet (93 m<sup>2</sup>) of floor area (as established in Table 403.3.1.1 of the *International Mechanical Code*);
  - d. That include *demand control ventilation* configured to reduce outdoor air by at least 50% below design minimum ventilation rates when the actual occupancy of the space served by the system is less than the design occupancy; and

- e. Smaller than 650 square feet.
- 2. Systems installed for the sole purpose of providing makeup air for systems exhausting toxic, flammable, paint, or corrosive fumes or dust, dryer exhaust, or commercial kitchen hoods used for collecting and removing grease vapors and smoke.
- 3. The energy recovery systems for R-1 and R-2 occupancies are permitted to provide 60 percent minimum sensible heat recovery effectiveness in lieu of 60 percent enthalpy recovery effectiveness. The return/exhaust air stream temperature for heat recovery device selection shall be 70°F or as determined by an *approved* calculation procedure.

**Section C403.3.6 is amended to add an Informative Note:**

**City Informative Note.** When an H/ERV (heat recovery ventilator or energy recovery ventilator) that is rated and listed in accordance with HVI 920 is used to comply with the "sensible recovery effectiveness" requirement in Section C403.3.6 or C403.7.6 Exception 2, use the product's Adjusted Sensible Recovery Efficiency (ASRE) at 32°F, as listed in the HVI Section 3 H/ERV Directory. Select the ASRE for a flow rate that is no less than the design flow rate, or interpolate between two listed flow rates. HVI refers to the Home Ventilating Institute.

**A new section, Section C403.3.7 with Table C403.3.7 is added and shall reads follows:**

**C403.3.7 Hydronic System flow rate.** Chilled water and condenser water piping shall be designed such that the design flow rate in each pipe segment shall not exceed the values listed in Table C403.3.7 for the appropriate total annual hours of operation. Pipe sizes for systems that operate under variable flow conditions (e.g., modulating two-way control valves at coils) and that contain variable speed pump motors are permitted to be selected from the "Variable Flow/Variable Speed" columns. All others shall be selected from the "Other" columns.

**EXCEPTION.** Design flow rates exceeding the values in Table C403.3.7 are permitted in specific sections of pipe if the pipe is not in the critical circuit at design conditions and is not predicted to be in the critical circuit during more than 30 percent of operating hours.

**City Informative Note.** The flow rates listed here do not consider noise or erosion. Lower flow rates are often recommended for noise sensitive locations.

**TABLE C403.3.7**  
**PIPING SYSTEM DESIGN MAXIMUM FLOW RATE IN GPM<sup>1</sup>**

<u>Pipe Size</u>  (in)	<u>&lt;= 2000 hours/yr</u>		<u>&gt;2000 and &lt;= 4400 hours/year</u>		<u>&gt; 4400 hours/year</u>	
	<u>Other</u>	<u>Variable Flow/ Variable Speed</u>	<u>Other</u>	<u>Variable Flow/ Variable Speed</u>	<u>Other</u>	<u>Variable Flow/ Variable Speed</u>
<u>2 1/2</u>	<u>120</u>	<u>180</u>	<u>85</u>	<u>130</u>	<u>68</u>	<u>110</u>
<u>3</u>	<u>180</u>	<u>270</u>	<u>140</u>	<u>210</u>	<u>110</u>	<u>170</u>
<u>4</u>	<u>350</u>	<u>530</u>	<u>260</u>	<u>400</u>	<u>210</u>	<u>320</u>
<u>5</u>	<u>410</u>	<u>620</u>	<u>310</u>	<u>470</u>	<u>250</u>	<u>370</u>

<u>6</u>	<u>740</u>	<u>1100</u>	<u>570</u>	<u>860</u>	<u>440</u>	<u>680</u>
<u>8</u>	<u>1200</u>	<u>1800</u>	<u>900</u>	<u>1400</u>	<u>700</u>	<u>1100</u>
<u>10</u>	<u>1800</u>	<u>2700</u>	<u>1300</u>	<u>2000</u>	<u>1000</u>	<u>1600</u>
<u>12</u>	<u>2500</u>	<u>3800</u>	<u>1900</u>	<u>2900</u>	<u>1500</u>	<u>2300</u>

1. There are no requirements for pipe sizes smaller than the minimum size or larger than the maximum size shown in the table.

**Section C403.4.1 is amended to read as follows:**

**C403.4.1 Thermostatic controls.** The supply of heating and cooling energy to each *zone* shall be controlled by individual thermostatic controls capable of responding to temperature within the *zone*. Controls in the same *zone* or in neighboring *zones* connected by openings larger than 10 percent of the floor area of either *zone* shall not allow for simultaneous heating and cooling. At a minimum, each floor of a building shall be considered as a separate *zone*. Controls on systems required to have economizers and serving single *zones* shall have multiple cooling stage capability and activate the economizer when appropriate as the first stage of cooling. See Section C403.5 for further economizer requirements. Where humidification or dehumidification or both is provided, at least one humidity control device shall be provided for each humidity control system.

**Exceptions:**

1. Independent perimeter systems that are designed to offset only building envelope heat losses or gains or both serving one or more perimeter *zones* also served by an interior system provided:
  - 1.1. The perimeter system includes at least one thermostatic control *zone* for each building exposure having exterior walls facing only one orientation (within +/-45 degrees) (0.8 rad) for more than 50 contiguous feet (15,240 mm);
  - 1.2. The perimeter system heating and cooling supply is controlled by a thermostat located within the *zones* served by the system; and
  - 1.3. Controls are configured to prevent the perimeter system from operating in a different heating or cooling mode from the other equipment within the *zones* or from neighboring *zones* connected by openings larger than 10 percent of the floor area of either *zone*.
2. ~~Any interior *zone* open to a perimeter *zone* shall have set points and dead bands coordinated so that cooling in the interior *zone* shall not operate while the perimeter *zone* is in heating until the interior *zone* temperature is 5°F (2.8°C) higher than the perimeter *zone* temperature, unless the interior and perimeter *zones* are separated by a partition whose permanent openings are smaller than 10 percent of the perimeter *zone* floor area. Where an interior *zone* and a perimeter *zone* are open to each other with permanent openings larger than 10 percent of the floor area of either *zone*, cooling in the interior *zone* is permitted to operate at times when the perimeter *zone* is in heating and the interior *zone* temperature is at least 5°F (2.8°C) higher than the perimeter *zone* temperature. For the purposes of this exception, a permanent opening is an opening without doors or other operable closures.~~
3. Dedicated outdoor air units that provide *ventilation air*, make-up air or *replacement air* for exhaust systems are permitted to be controlled based on supply air temperature. The supply air temperature shall be controlled to a maximum of 65°F (18.3°C) in heating and a minimum of 72°F (22°C) in cooling unless the supply air temperature is being reset based on the status of cooling or heating in the *zones* served or it being reset based on outdoor air temperature.

**Section C403.4.1.1 is amended to read as follows:**

**C403.4.1.1 Heat pump supplementary heat.** ~~Unitary air-cooled heat pumps shall include microprocessor controls that minimize supplemental heat usage during start-up, set-up, and defrost conditions. These controls shall anticipate need for heat and use compression heating as the first stage of heat. Controls shall indicate when supplemental heating is being used through visual means (e.g., LED indicators). Heat pumps equipped with supplementary heaters shall be installed with controls that prevent supplemental heater operation above 40°F (4.4°C). Heat pumps equipped with internal electric resistance heaters shall have controls that prevent supplemental heater operation when the heating load can be met by the heat pump alone during both steady-state operation and setback recovery. Supplemental heater operation is permitted during outdoor coil defrost cycles. Heat pumps equipped with supplementary heaters shall comply with all conditions of Section C403.1.4.~~

**Exception:** ~~Packaged terminal heat pumps (PTHPs) of less than 2 tons (24,000 Btu/hr) cooling capacity provided with controls that prevent supplementary heater operation above 40°F. Heat pumps whose minimum efficiency is regulated by NAECA and whose ratings meet the requirements shown in Table C403.3.2(2) and include all usage of internal electric resistance heating.~~

**Section 403.4.2 is amended to read as follows:**

**C403.4.2 Off-hour controls.** For all occupancies other than Group R and for conditioned spaces other than dwelling units within Group R occupancies, each zone shall be provided with thermostatic setback controls that are controlled by either an *automatic* time clock or programmable control system.

**Exceptions:**

1. Zones that will be operated continuously.
2. Zones with a full HVAC load demand not exceeding 6,800 Btu/h (2 kW) and having a manual shutoff switch located with *ready access*.

**A new section, Section C403.4.12 is added and reads as follows:**

**C403.4.12 Pressure Independent Control Valves.** Where design flow rate of heating water and chilled water coils is 10 GPM or higher, modulating pressure independent control valves shall be provided.

**Section C403.5 is amended to read as follows:**

**C403.5 Economizers.** Air economizers shall be provided on all new cooling systems including those serving computer server rooms, electronic equipment, radio equipment, and telephone switchgear. Economizers shall comply with Sections C403.5.1 through C403.5.5.

**Exception:** Economizers are not required for the systems listed below:

1. Cooling systems not installed outdoors nor in a mechanical room adjacent to outdoors and

- installed in conjunction with DOAS complying with Section C403.3.5 and serving only spaces with year-round cooling loads from lights and equipment of less than 5 watts per square foot.
2. Unitary or packaged systems serving one zone with dehumidification ~~that affect other systems so as to where an economizer would~~ increase the overall building energy consumption. New humidification equipment shall comply with Section C403.3.2.5.
  3. Unitary or packaged systems serving one zone where the cooling efficiency meets or exceeds the efficiency requirements in Table C403.5.(3).

**TABLE C403.5(3)**  
**EQUIPMENT EFFICIENCY PERFORMANCE EXCEPTION FOR ECONOMIZERS**

<u>Climate Zone</u>	<u>Efficiency Improvement<sup>a</sup></u>
4C	64%
5B	59%

a. If a unit is rated with an IPLV, IEER or SEER then to eliminate the required air or water economizer, the minimum cooling efficiency of the HVAC unit must be increased by the percentage shown. If the HVAC unit is only rated with a full load metric like EER or COP cooling, then these must be increased by the percentage shown.

4. Equipment serving chilled beams and chilled ceiling space cooling systems only which are provided with a water economizer meeting the requirements of Section C403.5.4.
5. For Group R occupancies, cooling units installed outdoors or in a mechanical room adjacent to outdoors with a total cooling capacity less than 20,000 Btu/h and other cooling units with a total cooling capacity less than 54,000 Btu/h provided that these are high-efficiency cooling equipment with IEER, CEER, SEER, and EER values more than 15 percent higher than minimum efficiencies listed in Tables C403.3.2(1) through (3), in the appropriate size category, using the same test procedures. Equipment shall be listed in the appropriate certification program to qualify for this exception. For split systems, compliance is based on the cooling capacity of individual fan coil units.
6. Equipment used to cool *Controlled Plant Growth Environments* provided these are high-efficiency cooling equipment with SEER, EER and IEER values a minimum of 20 percent greater than the values listed in Tables C403.3.2(1), (3) and (7).
7. Equipment serving a space with year-round cooling loads from lights and equipment of 5 watts per square foot or greater complying with the following criteria:
  - 7.1. Equipment serving the space utilizes chilled water as the cooling source; and
  - 7.2. The chilled water plant includes a condenser heat recovery system that meets the requirements of Section C403.9.5 or the building and water-cooled system meets the following requirements:
    - 7.2.1. A minimum of 90 percent (capacity-weighted) of the building space heat is provided by hydronic heating water.
    - 7.2.2. Chilled water plant includes a heat recovery chiller or water-to-water heat pump capable of rejecting heat from the chilled water system to the hydronic heating equipment capacity.
    - 7.2.3. Heat recovery chillers shall have a minimum COP of 7.0 when providing heating and cooling water simultaneously.
8. Water-cooled equipment served by systems meeting the requirements of Section C403.9.2.4, Condenser heat recovery.
9. Dedicated outdoor air systems that include energy recovery as required by Section C403.7.6 but that do not include mechanical cooling.
10. Dedicated outdoor air systems not required by Section C403.7.6 to include energy recovery

that modulate the supply airflow to provide only the minimum outdoor air required by Section C403.2.2.1 for ventilation, exhaust air make-up, or other process air delivery.

11. Equipment used to cool any dedicated server room, electronic equipment room, elevator machine room or telecom switch room provided the system complies with Option a, b, c, d, or e in the table C403.5(11) below. The total cooling capacity of all fan systems qualifying under this exception without economizers shall not exceed 240,000 Btu/h per building or 10 percent of its air economizer capacity, whichever is greater. This exception shall not be used for Total Building Performance.

**Table C403.5(11)**  
**Server room, electronic equipment room or telecom room cooling equipment**

	Equipment Type	Higher Equipment Efficiency	Part-Load Control	Economizer
Option a	Tables C403.3.2(1) and C403.3.2(2) <sup>a</sup>	+15% <sup>b</sup>	Required over 85,000 Btu/h <sup>c</sup>	None Required
Option b	Tables C403.3.2(1) and C403.3.2(2) <sup>a</sup>	+5% <sup>d</sup>	Required over 85,000 Btu/h <sup>c</sup>	Water-side Economizer <sup>e</sup>
Option c	ASHRAE Standard 127 <sup>f</sup>	+0% <sup>g</sup>	Required over 85,000 Btu/h <sup>c</sup>	Water-side Economizer <sup>e</sup>
<u>Option d</u>	<u>Table C403.3.2(7)<sup>h</sup></u>	<u>+ 25%<sup>i</sup></u>	<u>Required for all chillers<sup>j</sup></u>	None Required
<u>Option e</u>	<u>Table C403.3.2(7)<sup>h</sup></u>	<u>+ 10/15%<sup>k</sup></u>	<u>Required over 85,000 Btu/h<sup>c</sup></u>	<u>Dedicated waterside Economizer<sup>e</sup></u>

Notes for Exception 11/Footnotes for Table C403.5(11):

- For a system where all of the cooling equipment is subject to the AHRI standards listed in Tables C403.3.2(1) and C403.3.2(2), the system shall comply with ~~all of the following~~ the higher equipment efficiency, part-load control and economizer requirements of the row in which this footnote is located, including the associated footnotes (note that if the system contains any cooling equipment that exceeds the capacity limits in Table C403.3.2(1) or C403.3.2(2), or if the system contains any cooling equipment that is not included in Table C403.3.2(1) or C403.3.2(2), then the system is not allowed to use this option).
- The cooling equipment shall have an SEER/EER value and an IEER/IPLV value that ~~((is))~~ are each a minimum of 15 percent greater than the value listed in Tables C403.3.2(1) and C403.3.2(2).
- For units with a total cooling capacity over 85,000 Btu/h, the system shall utilize part-load capacity control schemes that are able to modulate to a part-load capacity of 50 percent of the load or less that results in the compressor operating at the same or higher EER at part loads than at full load (e.g., minimum of two-stages of compressor unloading such as cylinder unloading, two-stage scrolls, dual tandem scrolls, but hot gas bypass is not credited as a compressor unloading system).
- The cooling equipment shall have an SEER/EER value and an IEER/IPLV value that ~~((is))~~ are each a minimum of 5 percent greater than the value listed in Tables C403.3.2(1) and C403.3.2(2).
- The system shall include a water economizer in lieu of air economizer. Water economizers shall meet the requirements of Sections C403.5.1 and C403.5.2 and be capable of providing the total concurrent cooling load served by the connected terminal equipment lacking airside economizer, at outside air temperatures of 50°F dry-bulb/45°F wet-bulb and below. For this calculation, all factors including solar and internal load shall be the same as those used for peak load calculations, except for the outside temperatures. The equipment shall be served by a dedicated condenser water system unless a non-dedicated condenser water system exists that can provide appropriate water temperatures during hours when water-side economizer cooling is available.
- For a system where all cooling equipment is subject to ASHRAE Standard 127, the system shall comply with the higher equipment efficiency, part-load control, and economizer requirements of the row in which this footnote is located, including the associated footnotes.
- The cooling equipment subject to ASHRAE Standard 127 shall have an ~~((EER value and an IPLV))~~ SCOP value that is ~~((equal or))~~ a minimum of 10 percent greater than the value listed in Tables C403.3.2(1) and C403.3.2(2) (1.10 x values in these tables) when determined in accordance with the rating conditions in ASHRAE Standard 127 (i.e., not the rating conditions in AHRI Standard 210/240 or 340/360). This information shall be provided by an independent third party.
- For a system with chillers subject to the AHRI standards listed in Table C403.3.2(7) (e.g., a chilled water system with fan coil units), the system shall comply with the higher equipment efficiency, part-load control and economizer requirements of the row in which this footnote is located, including the associated footnotes.

- i. The cooling equipment shall have an full-load EER value and an IPLV value that is a minimum of 25 percent greater than the value listed in Table C403.3.2(7) (1.25 x value in Table C403.3.2(7) or a full-load and IPLV kW/ton that is at least 25 percent lower than the value listed in Table C403.3.2(7) (0.75 x value in Table C403.3.2(7)). For all chillers, the system shall utilize part-load capacity control schemes that are able to modulate to a part-load capacity of 50 percent of the load or less and that result in the compressor operating at the same or higher EER at part loads than at full load (e.g., minimum of two-stages of compressor unloading such as cylinder unloading, two-stage scrolls, or dual tandem scrolls, but hot gas bypass is not a qualifying compressor unloading system).
- j. For air-cooled chillers, the system shall utilize part-load capacity control schemes that are able to modulate to a part-load capacity of 50 percent of the load or less and that result in the compressor operating at the same or higher EER at part loads than at full load (e.g., minimum of two-stages of compressor unloading such as cylinder unloading, two-stage scrolls, or dual tandem scrolls, but hot gas bypass is not a qualifying compressor unloading system).
- k. For air-cooled chillers, the cooling equipment shall have an IPLV EER value that is a minimum of 10 percent greater than the IPLV EER value listed in Table C403.3.2(7) (1.10 x values in Table C403.3.2(7)). For water-cooled chillers, the cooling equipment shall have an IPLV kW/ton that is at least 15 percent lower than the IPLV kW/ton value listed in Table C403.3.2(7) (0.85 x values in Table C403.3.2(7)).

12. Medical and laboratory equipment that is directly water-cooled and is not dependent upon space air temperature.

**Section 403.6.10 is amended to read as follows:**

**C403.6.10 High efficiency variable air volume (VAV) systems.** For HVAC systems subject to the requirements of Section C403.3.5 but utilizing Exception 2 of that section, a high efficiency multiple-zone VAV system may be provided without a separate parallel DOAS when the system is designed, installed, and configured to comply with all of the following criteria in addition to the applicable requirements of Sections C403.8.6 through C403.8.8. (This exception shall not be used as a substitution for a DOAS per Section C406.6 or C406.7:

1. Each VAV system must serve a minimum of 3,000 square feet (278.7 m<sup>2</sup>) and have a minimum of five VAV zones.
2. The VAV systems are provided with airside economizer per Section C403.5 without exceptions.
3. A direct-digital control (DDC) system is provided to control the VAV air handling units and associated terminal units per Section C403.4.11 regardless of sizing thresholds of Table C403.4.11.1.
4. Multiple-zone VAV systems with a minimum outdoor air requirement of 2,500 cfm (1180 L/s) or greater shall be equipped with a device capable of measuring outdoor airflow intake under all load conditions. The system shall be capable of increasing or reducing the outdoor airflow intake based on feedback from the VAV terminal units as required by Section C403.6.5, without exceptions, and Section C403.7.1, Demand controlled ventilation.
5. Multiple-zone VAV systems with a minimum outdoor air requirement of 2,500 cfm (1180 L/s) or greater shall be equipped with a device capable of measuring supply airflow to the VAV terminal units under all load conditions.
6. In addition to meeting the zone isolation requirements of C403.2.1 a single VAV air handling unit shall not serve more than 50,000 square feet (4645 m<sup>2</sup>) unless a single floor is greater than 50,000 square feet (4645 m<sup>2</sup>) in which case the air handler is permitted to serve the entire floor.
7. The primary maximum cooling air for the VAV terminal units serving interior cooling load driven zones shall be sized for a supply air temperature that is a minimum of 5°F greater than the supply air temperature for the exterior zones in cooling.
8. Air terminal units with a minimum primary airflow set point of 50 percent or greater of the

maximum

primary airflow set point shall be sized with an inlet velocity of no greater than 900 feet per minute.

Allowable fan motor horsepower shall not exceed 90 percent of the allowable HVAC fan system bhp

(Option 2) as defined by Section C403.8.1.1.

9. All fan powered VAV terminal units (series or parallel) shall be provided with electronically commutated motors. The DDC system shall be configured to vary the speed of the motor as a function of the heating and cooling load in the space. Minimum speed shall not be greater than 66 percent of design airflow required for the greater of heating or cooling operation. Minimum speed shall be used during periods of low heating and cooling operation and ventilation-only operation.

**Exception:** For series fan powered terminal units where the volume of primary air required to deliver the ventilation requirements at minimum speed exceeds the air that would be delivered at the speed defined above, the minimum speed set point shall be configured to exceed the value required to provide the required ventilation air.

10. Fan-powered VAV terminal units shall only be permitted at perimeter zones with an envelope heating load requirement. All other VAV terminal units shall be single duct terminal units.

**Exception:** Fan powered VAV terminal units are allowed at interior spaces with an occupant load greater than or equal to 25 people per 1000 square feet of floor area (as established in Table

403.3.1.1 of the *International Mechanical Code*) with demand control ventilation in accordance with Section C403.7.1.

11. When in occupied heating or in occupied dead band between heating and cooling all fan powered VAV terminal units shall be configured to reset the primary air supply set point, based on the VAV air handling unit outdoor air vent fraction, to the minimum ventilation airflow required per *International Mechanical Code*.

12. Spaces that are larger than 150 square feet (14 m<sup>2</sup>) and with an occupant load greater than or equal to ~~25~~ 15 people per 1000 square feet (93 m<sup>2</sup>) of floor area (as established in Table 403.3.1.1 of the *International Mechanical Code*) shall be provided with all of the following features:

12.1. A dedicated VAV terminal unit capable of controlling the space temperature and minimum ventilation shall be provided. Demand control ventilation (DCV) shall be provided that utilizes a carbon dioxide sensor to reset the ventilation set point of the VAV terminal unit from the design minimum to design maximum ventilation rate as required by Chapter 4 of the *International Mechanical Code*.

12.2. Occupancy sensors shall be provided that are configured to reduce the minimum ventilation rate to zero and setback room temperature set points by a minimum of 5°F, for both cooling and heating, when the space is unoccupied.

13. Dedicated data centers, computer rooms, electronic equipment rooms, telecom rooms, or other similar spaces with cooling loads greater than 5 watts/ft<sup>2</sup> shall be provided with separate, cooling systems to allow the VAV air handlers to turn off during unoccupied hours in the office space and to allow the supply air temperature reset to occur.

**Exception:** The VAV air handling unit and VAV terminal units may be used for secondary backup cooling when there is a failure of the primary HVAC system.

Additionally, computer rooms, electronic equipment rooms, telecom rooms, or other similar spaces shall be provided with airside economizer in accordance with Section



C403.5 without using the exceptions to Section C403.5.

**Exception:** Heat recovery per exception 9 of Section C403.5 may be in lieu of airside economizer for the separate, independent HVAC system.

14. HVAC system central heating or cooling plant will include a minimum of one of the following options:
  - 14.1. VAV terminal units with hydronic heating coils connected to systems with hot water generation equipment limited to the following types of equipment: gas-fired hydronic boilers with a thermal efficiency,  $E_t$ , of not less than 92 percent, air-to-water heat pumps or heat recovery chillers. Hydronic heating coils shall be sized for a maximum entering hot water temperature of 120°F (48.9°C) for peak anticipated heating load conditions.
  - 14.2. Chilled water VAV air handling units connected to systems with chilled water generation equipment with IPLV values more than 25 percent higher than the minimum part load efficiencies listed in Table C403.3.2(7), in the appropriate size category, using the same test procedures. Equipment shall be listed in the appropriate certification program to qualify. The smallest chiller or compressor in the central plant shall not exceed 20 percent of the total central plant cooling capacity or the chilled water system shall include thermal storage sized for a minimum of 20 percent of the total central cooling plant capacity.
15. The DDC system shall include a fault detection and diagnostics (FDD) system complying with the following:
  - 15.1. The following temperature sensors shall be permanently installed to monitor system operation:
    - 15.1.1. Outside air.
    - 15.1.2. Supply air.
    - 15.1.3. Return air.
  - 15.2. Temperature sensors shall have an accuracy of  $\pm 2^\circ\text{F}$  ( $1.1^\circ\text{C}$ ) over the range of 40°F to 80°F ( $4^\circ\text{C}$  to  $26.7^\circ\text{C}$ ).
  - 15.3. The VAV air handling unit controller shall be configured to provide system status by indicating the following:
    - 15.3.1. Free cooling available.
    - 15.3.2. Economizer enabled.
    - 15.3.3. Compressor enabled.
    - 15.3.4. Heating enabled.
    - 15.3.5. Mixed air low limit cycle active.
    - 15.3.6. The current value of each sensor.
  - 15.4. The VAV air handling unit controller shall be capable of manually initiating each operating mode so that the operation of compressors, economizers, fans and the heating system can be independently tested and verified.
  - 15.5. The VAV air handling unit shall be configured to report faults to a fault management application able to be accessed by day-to-day operating or service personnel or annunciated locally on zone thermostats.
  - 15.6. The VAV terminal unit shall be configured to report if the VAV inlet valve has failed by performing the following diagnostic check at a maximum interval of once a month:
    - 15.6.1. Command VAV terminal unit primary air inlet valve closed and verify that primary airflow goes to zero or other approved means to verify that the VAV terminal unit damper actuator and flow ring are operating properly.

- 15.6.2. Command VAV thermal unit primary air inlet valve to design airflow and verify that unit is controlling to within 10% of design airflow.
- 15.7. The VAV terminal unit shall be configured to report and trend when the zone is driving the following VAV air handling unit reset sequences. The building operator shall have the capability to exclude zones used in the reset sequences from the DDC control system graphical user interface:
  - 15.7.1. Supply air temperature set point reset to lowest supply air temperature set point for cooling operation.
  - 15.7.2. Supply air duct static pressure set point reset for the highest duct static pressure set point allowable.
- 15.8. The FDD system shall be configured to detect the following faults:
  - 15.8.1. Air temperature sensor failure/fault.
  - 15.8.2. Not economizing when the unit should be economizing.
  - 15.8.3. Economizing when the unit should not be economizing.
  - 15.8.4. Outdoor air or return air damper not modulating.
  - 15.8.5. Excess outdoor air.
  - 15.8.6. VAV terminal unit primary air valve failure.

**Section 403.7.1 is amended to read as follows:**

**C403.7.1 Demand control ventilation.** Demand control ventilation (DCV) shall be provided for spaces larger than 500 square feet (46 m<sup>2</sup>) and with an occupant load greater than or equal to ~~25~~ 15 people per 1000 square feet (93 m<sup>2</sup>) of floor area (as established in Table 403.3.1.1 of the *International Mechanical Code*) and served by systems with one or more of the following:

1. An air-side economizer.
2. *Automatic* modulating control of the outdoor air damper.
3. A design outdoor airflow greater than 3,000 cfm (1416 L/s).

**Exception:** Demand control ventilation is not required for systems and spaces as follows:

1. Systems with energy recovery complying with Section C403.7.6.1 or Section C403.3.5.1. This exception is not available for space types located within the "inclusions" column of Groups A-1 and A-3 occupancy classifications of Table C403.3.5.
2. Multiple-zone systems without direct digital control of individual zones communicating with a central control panel.
3. System with a design outdoor airflow less than 750 cfm (354 L/s).
4. ~~Spaces where the supply airflow rate minus any makeup or outgoing transfer air requirement is less than 1,200 cfm (566 L/s).~~ Spaces, including but not limited to dining areas, where more than 75 percent of the space design outdoor airflow is transfer air required for makeup air supplying an adjacent commercial kitchen.
5. Ventilation provided for process loads only.
6. Spaces with one of the following occupancy categories (as defined by the *International Mechanical Code*): Correctional cells, daycare sickrooms, science labs, barbers, beauty and nail salons, and bowling alley seating.
7. Dormitory sleeping areas.

**Section 403.7.5 is amended to read as follows:**

**C403.7.5 Enclosed loading dock, motor vehicle repair garage and parking garage exhaust ventilation system controls.** Mechanical ventilation systems for enclosed loading docks, motor vehicle repair garage and parking garages shall be designed to exhaust the airflow rates (maximum and minimum) determined in accordance with the *International Mechanical Code*.

Ventilation systems shall be equipped with a control device that operates the system automatically by means of carbon monoxide detectors applied in conjunction with nitrogen dioxide detectors. Controllers shall be configured to shut off fans or modulate fan speed to 50 percent or less of design capacity, or intermittently operate fans less than 20 percent of the occupied time or as required to maintain acceptable contaminant levels in accordance with the *International Mechanical Code* provisions.

Gas sensor controllers used to activate the exhaust ventilation system shall stage or modulate fan speed upon detection of specified gas levels. All equipment used in sensor controlled systems shall be designed for the specific use and installed in accordance with the manufacturer's recommendations. The system shall be arranged to operate automatically by means of carbon monoxide detectors applied in conjunction with nitrogen dioxide detectors. Garage Parking garages, repair garages and loading docks shall be equipped with a controller and a full array of carbon monoxide (CO) sensors set to maintain levels of carbon monoxide below 35 parts per million (ppm). Additionally, a full array of nitrogen dioxide detectors shall be connected to the controller set to maintain the nitrogen dioxide level below the OSHA standard for eight hour exposure.

Spacing and location of the sensors shall be installed in accordance with manufacturer recommendations.

**Section C403.7.5.1 is amended to read as follows:**

**C403.7.5.1 System activation devices for enclosed loading docks.** Ventilation systems for enclosed loading docks shall operate continuously during unoccupied hours at the minimum ventilation rate required by Section 404 of the *International Mechanical Code* and shall be activated to the full required ventilation rate by one of the following:

1. Gas sensors installed in accordance with the *International Mechanical Code*; or
2. Occupant detection sensors used to activate the system that detects entry into the loading area along both the vehicle and pedestrian pathways.

**Section C403.7.5.2 is amended to read as follows:**

**C403.7.5.2 System activation devices for enclosed parking garages.** Ventilation systems for enclosed parking garages shall be activated by gas sensors.

**Exception:** A parking garage ventilation system having a total design capacity under 8,000 cfm may use occupant sensors to activate the full required ventilation rate.

**Section 403.7.6 is amended to read as follows:**

**C403.7.6 Energy recovery ventilation systems.** Any system with minimum outside air requirements at design conditions greater than 5,000 cfm or any system where the system's supply airflow rate exceeds the value listed in Tables C403.7.6(1) and C403.7.6(2), based on the climate zone and percentage of outdoor airflow rate at design conditions, shall include an energy recovery system. Table C403.7.6(1) shall be used for all ventilation systems that operate less than 8,000 hours per year, and Table C403.7.6(2) shall be used for all ventilation systems that operate 8,000 hours or more per year. The energy recovery system shall have the capability to provide a change in the enthalpy of the outdoor air supply of not less than ~~50~~ 60 percent of the difference between the outdoor air and return air enthalpies, at design conditions. Where an air economizer is required, the energy recovery system shall include a bypass of the energy recovery media for both the outdoor air and exhaust air or return air dampers and controls which permit operation of the air economizer as required by Section C403.5. Where a single room or space is supplied by multiple units, the aggregate ventilation (cfm) of those units shall be used in applying this requirement. The return/exhaust air stream temperature for heat recovery device selection shall be 70°F (21°C) at 30 percent relative humidity, or as calculated by the registered design professional.

**City Informative Note:** In Shoreline, the energy recovery effectiveness is determined typically by the winter heat recovery condition. See example below for how the minimum supply air enthalpy leaving the energy recovery media is calculated for the winter condition:

1. In Shoreline, the winter outdoor design air temperature is 24°F as specified in Appendix C. The registered design professional shall determine the coincident winter wet bulb temperature or percent relative humidity at the anticipated design conditions. Based on these conditions the outdoor design air enthalpy is determined from a psychrometric chart.

2. Determine the return/exhaust air stream enthalpy from a psychrometric chart based on the 70°F (21°C) at 30 percent relative humidity.

3. Calculate the 60% difference between the outside air and return air enthalpies at design winter conditions.

4. See example below:

a. OA Enthalpy at 24°F / 23°F (drybulb / wetbulb) = 8.2 BTU/LB

b. RA/EA Enthalpy at 70°F and 30% RH = 21.9 BTU/LB

c. SA Enthalpy Minimum Leaving Energy Recovery Media

= (8.2 + (21.9 – 8.2)\*60%)

= 16.42 BTU/LB

(Note that this example represents 60% enthalpy recovery. For an equivalent sensible-only recovery system, it would take 73.9% effectiveness (increasing from 24°F DB to 58°F DB) to achieve the same enthalpy recovery.)

**Exceptions:**

1. The energy recovery systems for occupancy type I-2 hospitals, medical office buildings, and buildings that primarily consist of technical laboratory spaces, are permitted to provide a change of enthalpy of the outdoor air and return air of not less than 50 percent of the difference between the outdoor air and return air enthalpies, at design conditions. These occupancies are also permitted to utilize exception #3.

2. The energy recovery systems for R-1 and R-2 occupancies shall have a 60 percent

minimum sensible heat recovery effectiveness, in lieu of 60 percent enthalpy recovery effectiveness. The return/exhaust air stream temperature for heat recovery device selection shall be 70°F (21°C), or as calculated by the registered design professional.

3. An energy recovery ventilation system shall not be required in any of the following conditions:
4. 3.1 Where energy recovery systems are restricted per Section 514 of the *International Mechanical Code* to sensible energy, recovery shall comply with one of the following:
    - 4.1. 3.1.1 Kitchen exhaust systems where they comply with Section C403.7.7.1.
    - 4.2. 3.1.2 Laboratory fume hood systems where they comply with Exception 2 of Section C403.7.6.
    - 4.3. 3.1.3 Other sensible energy recovery systems with the capability to provide a change in dry bulb temperature of the outdoor air supply of not less than 50 percent of the difference between the outdoor air and the return air dry bulb temperatures, at design conditions.
  2. 3.2 Laboratory fume hood systems that include at least one of the following features and also comply with Section C403.7.7.2:
    - 2.1. 3.2.1 Variable-air-volume hood exhaust and room supply systems capable of reducing exhaust and makeup air volume to 50 percent or less of design values.
    - 2.2. 3.2.2 Direct makeup (auxiliary) air supply equal to at least 75 percent of the exhaust rate, heated no warmer than 2°F (1.1°C) above room set point, cooled to no cooler than 3°F (1.7°C) below room set point, no humidification added, and no simultaneous heating and cooling used for dehumidification control.
  3. 3.3 Systems serving spaces that are heated to less than 60°F (15.5°C) and are not cooled.
  4. 3.4 Where more than 60 percent of the outdoor air heating energy is provided from site-recovered energy.
  5. 3.5 Systems exhausting toxic, flammable, paint or corrosive fumes or dust.
  6. 3.6 Cooling energy recovery in Climate Zones 3C, 4C, 5B, 5C, 6B, 7 and 8.
  7. 3.7 Systems requiring dehumidification that employ energy recovery in series with the cooling coil.
  8. 3.8 Multi-zone systems where the supply airflow rate is less than the values specified in Tables C403.7.6(1) and C403.7.6(2) for the corresponding percent of outdoor air. Where a value of NR is listed, energy recovery shall not be required.
  9. 3.9 Equipment which meets the requirements of Section C403.9.2.4.
  40. 3.10 Systems serving Group R-1 and R-3 dwelling or sleeping units where the largest source of air exhausted at a single location at the building exterior is less than 25 percent of the design outdoor air flow rate.

**Section C403.7.8.1 is amended to read as follows:**

**C403.7.8.1 Shutoff dampers for building isolation.** Outdoor air supply, exhaust openings and relief outlets and stairway and elevator hoistway shaft vents shall be provided with Class I motorized dampers. See Sections C403.10.1 and C403.10.2 for ductwork insulation requirements upstream and downstream of the shutoff damper.

**Exceptions:**

1. Gravity (nonmotorized) dampers shall be permitted in lieu of motorized dampers as follows:

- 1.1. Relief dampers serving systems less than ~~5,000~~ 300 cfm total supply shall be permitted in ~~buildings less than three stories in height~~.
- 1.2. Gravity (nonmotorized) dampers where the design outdoor air intake or exhaust capacity does not exceed ~~400~~ 300 cfm (189 L/s).
- 1.3. Systems serving areas which require continuous operation for 24/7 occupancy schedules.
2. Shutoff dampers are not required in:
  - 2.1. Combustion air intakes.
  - 2.2. Systems serving areas which require continuous operation in animal hospitals, kennels and pounds, laboratories, and Group H, I and R occupancies.
  - 2.3. Subduct exhaust systems or other systems that are required to operate continuously by the *International Mechanical Code*.
  - 2.4. Type I grease exhaust systems or other systems where dampers are prohibited by the *International Mechanical Code* to be in the airstream.
  - 2.5. Unconditioned stairwells or unconditioned elevator hoistway shafts that are only connected to unconditioned spaces.

**Section 403.8.1 is amended to read as follows:**

**C403.8.1 Allowable fan motor horsepower.** Each HVAC system having a total fan system motor nameplate horsepower exceeding 5 hp (3.7kW) at fan system design conditions shall not exceed the allowable *fan system motor nameplate hp* (Option 1) or *fan system bhp* (Option 2) as shown in Table C403.8.1(1). This includes supply fans, exhaust fans, return/relief fans, and fan-powered VAV air terminal units associated with systems providing heating or cooling capability. Single zone variable-air-volume systems shall comply with the constant volume fan power limitation. Zone heating and/or cooling terminal units installed in conjunction with a dedicated outdoor air system (DOAS) shall be evaluated as separate HVAC systems for allowable fan motor horsepower.

**Exceptions:**

1. Hospital, vivarium and laboratory systems that utilize flow control devices on exhaust or return to maintain space pressure relationships necessary for occupant health and safety or environmental control shall be permitted to use variable volume fan power limitation.
2. Individual exhaust fans with motor nameplate horsepower of 1 hp or less are exempt from the allowable fan motor horsepower requirements, but must meet the requirements of Section C405.8 for fractional hp fan motors.

**Section 403.8.3 is amended to read as follows:**

**C403.8.3 Fan efficiency.** Fans shall have a fan efficiency grade (FEG) of 67 or higher based on manufacturers' certified data, as defined by AMCA 205. The total efficiency of the fan at the design point of operation shall be within 15 percentage points of the maximum total efficiency of the fan.

**Exception:** The following fans are not required to have a fan efficiency grade:

1. Individual fans with a motor nameplate horsepower of 5 hp (3.7 kW) or less that are not part of a group operated as the functional equivalent of a single fan.
2. Multiple fans in series or parallel that have a combined motor nameplate horsepower of 5 hp (3.7 kW) or less and are operated as the functional equivalent of a single fan.
3. Fans that are part of equipment covered under Section C403.3.2.
4. Fans included in an equipment package certified by an approved agency for air or energy performance.
5. Powered wall/roof ventilators.
6. Fans outside the scope of AMCA 205.
7. Fans that are intended to operate only during emergency conditions.
8. Fans and fan arrays having a fan energy index (FEI) of not less than 1.00, or 0.95 for VAV systems, at the design point of operation, as determined in accordance with AMCA 208 by an approved, independent testing laboratory and labeled by the manufacturer. The FEI for fan arrays shall be calculated in accordance with AMCA 208 Annex C.

**Section C403.8.4 is amended to read as follows:**

**C403.8.4 Group R occupancy exhaust ventilation fan efficacy.** The Group R occupancies of the building shall be provided with ventilation that meets the requirements of the *International Mechanical Code*, as applicable, or with other approved means of ventilation. Mechanical ventilation system fans with 400 cfm or less in capacity shall meet the efficacy requirements of Table C403.8.4 at one or more rating points. Air flow shall be tested in accordance with Home Ventilating Standard (HVI) Standard 916 and listed. Fan efficacy shall be listed or shall be derived from listed power and airflow. Fan efficacy for fully ducted HRV, ERV, balanced, and in-line fans shall be determined at a static pressure of not less than 0.2 inch w.c. Fan efficacy for other exhaust fans shall be determined at a static pressure of not less than 0.1 inch w.c.

**Exceptions:**

- ~~1. Group R heat recovery ventilator and energy recovery ventilator fans that are less than 400 cfm.~~
2. 1. Where whole house ventilation fans are integrated with forced-air systems that are tested and listed HVAC equipment, provided they are powered by an electronically commutated motor where required by Section C405.8
3. 2. Domestic clothes dryer booster fans, domestic range hood exhaust fans, and domestic range booster fans that operate intermittently.
- 4.

**TABLE C403.8.4  
 GROUP R EXHAUST FAN EFFICACY**

Fan location	Air Flow Rate Minimum (cfm)	Minimum Efficacy (cfm/watt)	Air Flow Rate Minimum (cfm)
Exhaust fan: Bathroom, utility room, whole house	40	2.8	< 90
Exhaust fan: Bathroom, utility room, whole house	90	3.5	Any <u>≥ 90</u>

In-line (single-port and multi-port) fans	Any	3.8	Any
<u>ERV, HRV or balanced fan</u>		<u>1.2</u>	<u>Any</u>

**Section 403.9.1 is amended to read as follows:**

**C403.9.1 Heat rejection equipment.** Heat rejection equipment, including air-cooled condensers, dry coolers, open-circuit cooling towers, closed-circuit cooling towers and evaporative condensers, shall comply with this section.

**Exception:** Heat rejection devices where energy use is included in the equipment efficiency ratings listed in Tables C403.3.2(1)A, C403.3.2(1)B, C403.3.2(1)C, C403.3.2(2), C403.3.2(3), C403.3.2(7) and C403.3.2(9).

Heat rejection equipment shall have a minimum efficiency performance not less than values specified in Table C403.3.2(8).

Cooling towers serving chilled water systems shall be selected to maintain a return condenser water temperature to the tower of 86°F (30°C) or less at peak design conditions.

**EXCEPTION:** In existing buildings where physical constraints preclude a change from the original design, replacement cooling towers of the same or smaller capacity are exempt from this requirement.

Single-pass water cooling systems that use domestic water only one time before dumping it to waste shall not be used for hydronic heat pump and other cooling and refrigeration equipment, including but not limited to icemakers and walk-in coolers.

**EXCEPTIONS:**

1. Replacement of existing icemakers is exempt from this requirement.
2. Use of single-pass cooling for medical and dental equipment during power outages and other emergencies is exempt from this requirement.

**Section 403.9.2.2 is amended to read as follows:**

**C403.9.2.2 Steam condensate systems.** On-site steam heating systems shall have condensate water heat-recovery. On-site includes a system that is located within or adjacent to one or more buildings within the boundary of a contiguous area or campus under one ownership and which serves one or more of those buildings.

Buildings using steam generated off-site with steam heating systems which do not have condensate water recovery shall have condensate ~~water~~ heat recovery.



**Section 403.9.2.3 is amended to read as follows:**

**C403.9.2.3 Refrigeration condenser heat recovery.** Facilities having food service, meat or deli departments and having 500,000 Btu/h or greater of remote refrigeration condensers shall have condenser waste heat recovery from freezers and coolers and shall use the waste heat for service water heating, space heating or for dehumidification reheat. Facilities having a gross *conditioned floor area* of 40,000 ft<sup>2</sup> or greater and 1,000,000 Btu/h or greater of remote refrigeration shall have condenser waste heat recovery from freezers and coolers and shall use the waste heat for service water heating, and either for space heating or for dehumidification reheat for maintaining low space humidity. The required heat recovery system shall have the capacity to provide the smaller of:

1. 60 percent of the peak heat rejection load at design conditions, or
2. 50 percent of the sum of the service water heating load plus space heating load.

**Section C403.10.2 is amended to read as follows:**

**C403.10.2 Duct construction.** Ductwork shall be constructed and erected in accordance with the *International Mechanical Code*. For the purposes of this section, longitudinal seams are joints oriented in the direction of airflow. Transverse joints are connections of two duct sections oriented perpendicular to airflow. Duct wall penetrations are openings made by any screw, fastener, pipe, rod or wire. All other connections are considered transverse joints, including but not limited to spin-ins, taps and other branch connections, access door frames and jambs, and duct connections to equipment.

**Section C 403.10.2.3 is amended to read as follows:**

**C403.10.2.3 High-pressure and exterior duct systems.** Ducts designed to operate at static pressures equal to or greater than 3 inches water gauge (w.g.) (750 Pa) and all supply and return ductwork located outside the *building thermal envelope* that serves a *conditioned space* shall be insulated and sealed in accordance with Section C403.10.4. In addition, ducts and plenums shall be leak-tested in accordance with the SMACNA *HVAC Air Duct Leakage Test Manual* and shown to have a rate of air leakage (*CL*) less than or equal to 4.0, regardless of the Design Construction Pressure Class level, as determined in accordance with Equation 4-9. Ducts shall be tested using a pressure equal to the average operating pressure or the design Duct Construction Pressure Class level in accordance with the SMACNA HVAC Air Duct Leakage Test Manual.

$$CL = F/P^{0.65} \quad \text{(Equation 4-9)}$$

Where:

- F* = The measured leakage rate in cfm per 100 square feet of duct surface.  
*P* = The static pressure of the test.

Documentation shall be furnished by the designer demonstrating that representative sections totaling at least 25 percent of the duct area have been tested and that all tested sections meet the requirements of this section.

**Section C403.10.3 is amended to read as follows:**

**C403.10.3 Piping insulation.** All piping, other than refrigerant piping, serving as part of a heating or cooling system shall be thermally insulated in accordance with Table C403.10.3.

**Exceptions:**

1. Factory-installed piping within HVAC equipment tested and rated in accordance with a test procedure referenced by this code.
2. Factory-installed piping within room fan-coils and unit ventilators tested and rated according to AHRI 440 (except that the sampling and variation provisions of Section 6.5 shall not apply) and 840, respectively.
3. Piping that conveys fluids that have a design operating temperature range between 60°F (15°C) and 105°F (41°C).
4. Piping that conveys fluids that have not been heated or cooled through the use of fossil fuels or electric power.
5. Strainers, control valves, and balancing valves associated with piping 1 inch (25 mm) or less in diameter.
6. Direct buried piping that conveys fluids at or below 60°F (15°C).

**Section C403.10.3.1 is amended to read as follows:**

**C403.10.3.1 Protection of piping insulation.** Piping insulation exposed to weather shall be protected from damage, including that due to sunlight, moisture, equipment maintenance and wind, and shall provide shielding from solar radiation that can cause degradation of the material. Adhesives tape shall not be permitted.

**A new section, Section C403.10.4 is added and shall read as follows:**

**C403.10.4 Insulation of refrigerant piping.** Refrigerant piping, other than piping factory installed in HVAC equipment, shall have minimum 1/2-inch insulation within conditioned spaces and 1-inch insulation outside of conditioned spaces, at a conductivity rating of 0.21 to 0.26 Btu x in/(h x ft<sup>2</sup> x °F) with a mean temperature rating of 75°F.

**Section C403.12 is amended to read as follows:**

**C403.12 High efficiency single-zone variable air volume (VAV) systems.** For HVAC systems subject to the requirements of Section C403.3.5 but utilizing Exception 2 of that section, a high efficiency single-zone VAV system may be provided without a separate parallel DOAS when the system is designed, installed, and configured to comply with all of the following criteria (this ~~exception~~ option shall not be used as a substitution for a DOAS per Section C406.6 or as a modification to the requirements for the *Standard Reference Design* in accordance with Section C407):

1. The single-zone VAV system is provided with airside economizer in accordance with Section 403.3 without exceptions.
2. A direct-digital control (DDC) system is provided to control the system as a single zone in

- accordance with Section C403.4.11 regardless of sizing thresholds of Table C403.4.11.1.
3. Single-zone VAV systems with a minimum outdoor air requirement of 1,000 cfm (472 L/s) or greater shall be equipped with a device capable of measuring outdoor airflow intake under all load conditions. The system shall be capable of increasing or reducing the outdoor airflow intake based on Section C403.7.1, Demand controlled ventilation.
  4. Allowable fan motor horsepower shall not exceed 90 percent of the allowable HVAC fan system bhp (Option 2) as defined by Section C403.8.1.1.
  5. Each single-zone VAV system shall be designed to vary the supply fan airflow as a function of heating and cooling load and minimum fan speed shall not be more than the greater of:
    - 5.1. 30 percent of peak design airflow; or
    - 5.2. The required ventilation flow assuming no occupants.
  6. Spaces that are larger than 150 square feet (14 m<sup>2</sup>) and with an occupant load greater than or equal to 25 people per 1000 square feet (93 m<sup>2</sup>) of floor area (as established in Table 403.3.1.1 of the *International Mechanical Code*) shall be provided with all of the following features:
    - 6.1. Demand control ventilation (DCV) shall be provided that utilizes a carbon dioxide sensor to reset the ventilation set point of the single-zone VAV system from the design minimum to design maximum ventilation rate as required by Chapter 4 of the *International Mechanical Code*.
    - 6.2. Occupancy sensors shall be provided that are configured to reduce the minimum ventilation rate to zero and setback room temperature set points by a minimum of 5°F, for both cooling and heating, when the space is unoccupied.
  7. Single-zone VAV systems shall comply with one of the following options:
    - 7.1. Single-zone VAV air handling units with a hydronic heating coil connected to systems with hot water generation equipment limited to the following types of equipment: gas-fired hydronic boilers with a thermal efficiency,  $E_t$ , of not less than 92 percent, air-to-water heat pumps or heat recovery chillers. Hydronic heating coils shall be sized for a maximum entering hot water temperature of 120°F for peak anticipated heating load conditions.
    - 7.2. Single-zone VAV air handling units with a chilled water coil connected to systems with chilled water generation equipment with IPLV values more than 25 percent higher than the minimum part load efficiencies listed in Table C403.3.2(7), in the appropriate size category, using the same test procedures. Equipment shall be listed in the appropriate certification program to qualify. The smallest chiller or compressor in the central plant shall not exceed 20 percent of the total central plant cooling capacity or the chilled water system shall include thermal storage sized for a minimum of 20 percent of the total central cooling plant capacity.
    - 7.3. Single-zone VAV air handling units with DX cooling, heat pump heating or gas-fired furnace shall comply with the following requirements as applicable:
      - 7.3.1. Have a DX cooling coil with cooling part load efficiency that are a minimum of 15 percent higher than the minimum SEER or IEER listed in Tables C403.3.2(1) and C403.3.2(2).
      - 7.3.2. Have a gas-fired furnace with a thermal efficiency,  $E_t$ , of not less than 90 percent or heat pump with a minimum heating HSPF or COP efficiency that are a minimum of 10 percent higher than the minimum heating efficiency in Tables C403.3.2(1) and C403.3.2(2).
      - 7.3.3. Heating coils or burner output shall be modulating or have a minimum of 2 stages with the first stage being less than 50 percent of total heating capacity. Cooling coils shall be modulating or have a minimum of 2 stages with the first stage being less than 50

- percent of the total cooling capacity.
8. The DDC system shall include a fault detection and diagnostics (FDD) system complying with the following:
    - 8.1. The following temperature sensors shall be permanently installed to monitor system operation:
      - 8.1.1. Outside air.
      - 8.1.2. Supply air.
      - 8.1.3. Return air.
    - 8.2. Temperature sensors shall have an accuracy of  $\pm 2^{\circ}\text{F}$  ( $1.1^{\circ}\text{C}$ ) over the range of  $40^{\circ}\text{F}$  to  $80^{\circ}\text{F}$  ( $4^{\circ}\text{C}$  to  $26.7^{\circ}\text{C}$ ).
    - 8.3. The single-zone VAV air handling unit controller shall be configured to provide system status by indicating the following:
      - 8.3.1. Free cooling available.
      - 8.3.2. Economizer enabled.
      - 8.3.3. Compressor enabled.
      - 8.3.4. Heating enabled.
      - 8.3.5. Mixed air low limit cycle active.
      - 8.3.6. The current value of each sensor.
    - 8.4. The single-zone VAV air handling unit controller shall be capable of manually initiating each operating mode so that the operation of compressors, economizers, fans and the heating system can be independently tested and verified.
    - 8.5. The single-zone VAV air handling unit shall be configured to report faults to a fault management application able to be accessed by day-to-day operating or service personnel or annunciated locally on zone thermostats.
    - 8.6. The FDD system shall be configured to detect the following faults:
      - 8.6.1. Air temperature sensor failure/fault.
      - 8.6.2. Not economizing when the unit should be economizing.
      - 8.6.3. Economizing when the unit should not be economizing.
      - 8.6.4. Outdoor air or return air damper not modulating.
      - 8.6.5. Excess outdoor air.

**A new Section, Section C403.14 is added and shall read as follows:**

**C403.14 Compressed air and vacuum air.** Compressed air and vacuum air systems shall comply with all of the following:

**EXCEPTION:** Compressed air and vacuum air systems used for medical purposes are exempt from this section.

1. Air Compressors (50-150 PSI), General: Air compressors operating at 50-150 PSI shall comply with the following:
  - a. All water drains shall be “no air loss” drains.
  - b. Timed unheated desiccant air driers shall not be allowed.
2. Rotary Screw Air Compressors over 10 hp (50-150 PSI): Rotary screw air compressors over 10 hp operating at 50-150 PSI shall not rely on modulation control and shall have one of the following:
  - a. Receiver capacity greater than three gallons per cfm to allow efficient load/unload control;
  - b. Variable speed drive controlled air compressor; or
  - c. Multiple air compressors using a smaller trim-air compressor to trim. The trim compressor shall use variable speed drive control, or shall use load/unload control with greater than three gallon receiver capacity per cfm for the trim air compressor.

**A new section, Section C403.15 is added and shall read as follows:**

**C403.15 Commercial food service.** The following types of equipment within the scope of the applicable Energy Star program shall comply with the energy-efficiency and water-efficiency criteria required to achieve the Energy Star label:

- a. Commercial fryers: Energy Star Program Requirements for Commercial Fryers.
- b. Commercial hot food holding cabinets: Energy Star Program Requirements for Hot Food Holding Cabinets.
- c. Commercial steam cookers: Energy Star Program Requirements for Commercial Steam Cookers.
- d. Commercial dishwashers: Energy Star Program Requirements for Commercial Dishwashers.

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**SECTION C404  
 SERVICE WATER HEATING AND PRESSURE-BOOSTER SYSTEMS**

**Table C404.2 is amended to read as follows:**

**TABLE C404.2  
 MINIMUM PERFORMANCE OF WATER-HEATING EQUIPMENT**

EQUIPMENT TYPE	SIZE CATEGORY (input)	SUBCATEGORY OR RATING CONDITION	PERFORMANCE REQUIRED <sup>a, b</sup>	TEST PROCEDURE
Water heaters, electric	≤ 12 kW <sup>d</sup>	Tabletop <sup>e</sup> , ≥ 20 gal and < 120 gal	0.93 - 0.00132 V, EF	DOE 10 CFR Part 430
		Resistance ≥ 20 gal and ≤ 55 gal	0.960 - 0.0003 V, EF	
		Grid-enabled <sup>f</sup> > 75 gal and ≤ 120 gal	1.061 - 0.00168 V, EF	
	> 12 kW	Resistance ≥ 20 gal	$\frac{((0.3 + 27)/V_m \% / h^g)}$ $(0.3 + 27/V_m), \% / h^g$	Section G.2 of ANSI Z21.10.3
	≤ 24 amps and ≤ 250 volts	Heat pump	2.057 - 0.00113 V, EF	DOE 10 CFR Part 430
Instantaneous water heaters, electric	All	Resistance	0.93 - 0.00132 V, EF	DOE 10 CFR Part 430
Storage water heaters, gas	≤ 75,000 Btu/h	≥ 20 gal and ≤ 55 gal	0.675 - 0.0015 V, EF	DOE 10 CFR Part 430
		>55 gal and ≤ 100 gal	0.8012 – 0.00078 V, EF	
	> 75,000 Btu/h	< 4,000 Btu/h/gal	$80\% E_t$ $(Q/800 + 110\sqrt{V})SL$ , Btu/h	Section G.1 and G.2 of ANSI Z21.10.3
Instantaneous water heaters, gas	> 50,000 Btu/h and < 200,000 Btu/h	≥ 4,000 (Btu/h)/gal and < 2 gal	0.82 - 0.0019 V, EF	DOE 10 CFR Part 430
	≥ 200,000 Btu/h <sup>c</sup>	≥ 4,000 Btu/h/gal and < 10 gal	$80\% E_t$	Section G.1 and G.2 of ANSI Z21.10.3

	$\geq 200,000$ Btu/h	$\geq 4,000$ Btu/h/gal and $\geq 10$ gal	$80\% E_t$ $(Q/800 + 110\sqrt{V})SL$ , Btu/h	
Storage water heaters, oil	$\leq 105,000$ Btu/h	$\geq 20$ gal	0.68 - 0.0019V, EF	DOE 10 CFR Part 430
	$> 105,000$ Btu/h	$< 4,000$ Btu/h/gal	$80\% E_t$ $(Q/800 + 110\sqrt{V})SL$ , Btu/h	Section G.1 and G.2 of ANSI Z21.10.3
Instantaneous water heaters, oil	$\leq 210,000$ Btu/h	$\geq 4,000$ Btu/h/gal and $< 2$ gal	0.59 - 0.0019V, EF	DOE 10 CFR Part 430
	$> 210,000$ Btu/h	$\geq 4,000$ Btu/h/gal and $< 10$ gal	$80\% E_t$	Section G.1 and G.2 of ANSI Z21.10.3
	$> 210,000$ Btu/h	$\geq 4,000$ Btu/h/gal and $\geq 10$ gal	$78\% E_t$ $(Q/800 + 110\sqrt{V})SL$ , Btu/h	
Hot water supply boilers, gas and oil	$\geq 300,000$ Btu/h and $< 12,500,000$ Btu/h	$\geq 4,000$ Btu/h/gal and $< 10$ gal	$80\% E_t$	Section G.1 and G.2 of ANSI Z21.10.3
Hot water supply boilers, gas	$\geq 300,000$ Btu/h and $< 12,500,000$ Btu/h	$\geq 4,000$ Btu/h/gal and $\geq 10$ gal	$80\% E_t$ $(Q/800 + 110\sqrt{V})SL$ , Btu/h	
Hot water supply boilers, oil	$\geq 300,000$ Btu/h and $< 12,500,000$ Btu/h	$\geq 4,000$ Btu/h/gal and $> 10$ gal	$78\% E_t$ $(Q/800 + 110\sqrt{V})SL$ , Btu/h	
Pool heaters, gas and oil	All	—	$82\% E_t$	ASHRAE 146
Heat pump pool heaters	All	—	4.0 COP	AHRI 1160
Unfired storage tanks <sup>h</sup>	All	—	Minimum insulation requirement R-12.5 $(h \times ft^2 \times ^\circ F)/Btu$	(none)

For SI: °C = [(°F) - 32]/1.8, 1 British thermal unit per hour = 0.2931 W, 1 gallon = 3.785 L, 1 British thermal unit per hour per gallon = 0.078 W/L.

- a. Energy factor (EF) and thermal efficiency ( $E_t$ ) are minimum requirements. In the EF equation,  $V$  is the rated volume in gallons.
- b. Standby loss (SL) is the maximum Btu/h based on a nominal 70°F temperature difference between stored water and ambient requirements. In the SL equation,  $Q$  is the nameplate input rate in Btu/h. In the SL equation for electric water heaters,  $V$  is the rated volume in gallons and  $V_m$  is the measured volume in gallons. In the SL equation for oil and gas water heaters and boilers,  $V$  is the rated volume in gallons.
- c. Instantaneous water heaters with input rates below 200,000 Btu/h must comply with these requirements if the water heater is designed to heat water to temperatures 180°F or higher.
- d. Electric water heaters with an input rating of 12kW (40,950 Btu/h) or less that are designed to heat water to temperatures of 180°F or greater shall comply with the requirements for electric water heaters that have an input rating greater than 12 kW.
- e. A tabletop water heater is a water heater that is enclosed in a rectangular cabinet with a flat top surface not more than three feet (0.91 m) in height.
- f. A grid-enabled water heater is an electric resistance water heater that meets all of the following:
  1. Has a rated storage tank volume of more than 75 gallons.
  2. Is manufactured on or after April 16, 2015.
  3. Is equipped at the point of manufacture with an activation lock.
  4. Bears a permanent label applied by the manufacturer that complies with all of the following:
    - 4.1 Is made of material not adversely affected by water.
    - 4.2 Is attached by means of non-water soluble adhesive.
    - 4.3 Advises purchasers and end-users of the intended and appropriate use of the product with the following notice printed in 16.5 point Arial Narrow Bold font: "IMPORTANT INFORMATION: This water heater is intended only for use as a part of an electric thermal storage or demand response program. It will not provide adequate hot water unless enrolled in such a program and activated by your utility company or another program operator. Confirm the availability of a program in your local area before purchasing or installing this product."
- g. %/h is the energy consumed to replace the heat lost from the tank while on standby, expressed as a percentage of the total energy in the stored water per hour.
- h. In accordance with Section C404.6.1

**A new section, Section C404.2.3 is added as shall read as follows:**

**C404.2.3 Group R-1 and R-2 occupancies with central service water heating systems. In buildings with central service water heating systems serving four or more Group R-1 or R-2 dwelling or sleeping units, the primary water heating equipment shall not use fossil fuel combustion or electric resistance. Service hot water shall be provided by an air-source heat pump water heating (HPWH) system meeting the requirements of this section. Supplemental service water heating equipment is permitted to use electric resistance in compliance with Section C404.2.3.4.**

**Exceptions.**

1. Permits applied for prior to January 1, 2022.
2. Solar thermal, wastewater heat recovery, other approved waste heat recovery, ground source heat pump, watersource heat pump system utilizing waste heat, and combinations thereof, are permitted to offset all or any portion of the required HPWH capacity where such systems comply with this code and the Uniform Plumbing Code.
3. Systems meeting the requirements of the Northwest Energy Efficiency Alliance (NEEA) Advanced Water Heater Specifications for central service water heating systems.

**City Informative Note:** As of the publication of this code, publication of the NEEA AWHs for central service water heating systems is still pending. See <https://neea.org/resources/advanced-water-heating-specification> for updated information.

**A new section, Section C404.2.3.1 is added and shall read as follows:**

**C404.2.3.1 Primary heat pump system sizing.** The system shall include a primary service minimum output at 40°F outdoor air temperature that provides sufficient hot water for R-1 and/or R-2 occupancy uses as calculated using the equipment manufacturer's selection criteria or another *approved* methodology. Air source heat pumps shall be sized to deliver no less than 50 percent of the calculated demand for hot water production during the peak demand period when entering air temperature is 24°F.

**Exception.** 50 percent sizing at 24°F is not required for heat pumps located in a below-grade enclosed parking structure or other ventilated and unconditioned space that is not anticipated to fall below 40°F at any time.

<b><u>City Informative Note:</u></b> Estimates of the appropriate heat pump system sizing and hot water storage volume for HPHW systems, calculated per bedroom or per occupant, vary widely, depending on type of use, output capacity of the heat pumps, and other factors.
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**A new section, Section C404.2.3.2 is added and shall read as follows:**

**C404.2.3.2 Primary hot water storage sizing.** The system shall provide sufficient hot water, as calculated using a *approved* methodology, to satisfy peak demand period requirements.

**A new section, Section C404.2.3.3 and C404.2.3.3.1 is added and shall read as follows:**

**C404.2.3.3. System Design.** The service water heating system shall be configured to conform to one of the following provisions.

1. For *single-pass* HPWHs, *temperature maintenance* heating provided for reheating return water from the building's heated water circulation system shall be physically decoupled from the primary service water heating system storage tank(s) in a manner that prevents destratification of the primary system storage tanks. *Temperature maintenance* heating is permitted to be provided by electric resistance or a separate dedicated heat pump system.
2. For *multi-pass* HPWHs, recirculated *temperature maintenance* water is permitted to be returned to the primary water storage tanks for reheating.

**C404.2.3.3.1 Mixing valve.** A thermostatic mixing valve capable of supplying hot water to the building at the user temperature set point shall be provided, in compliance with requirements of the Uniform Plumbing Code and the HPWH manufacturer's installation guidelines. The mixing valve shall be sized and rated to deliver tempered water in a range from the minimum flow of the *temperature maintenance* recirculation system up to the maximum demand for the fixtures served.

**A new section, Section C404.2.3.4 is added and shall read as follows:**



**C404.2.3.4. Supplemental Water Heaters.** Total supplemental electric resistance water heating equipment shall not have an output capacity greater than the primary water heating equipment at 40°F entering air temperature. Supplemental electric resistance heating is permitted for the following uses:

1. Temperature maintenance of heated-water circulation systems, physically separate from the primary service water heating system. Temperature maintenance heating capacity shall be no greater than the primary water heating capacity at 40°F.
2. Defrost of compressor coils.
3. Heat tracing of piping for freeze protection or for temperature maintenance in lieu of recirculation of hot water.
4. Backup or low ambient temperature conditions, where all of the following are true:
  - a. The supplemental heating capacity is no greater than the primary service water heating capacity at 40°F.
  - b. During normal operations the supplemental heating is controlled to operate only when the entering air temperature at the air-source HPWH is below 40°F, and the primary HPWH compressor continues to operate together with the supplemental heating when the entering air temperature is between 17°F and 40°F.
  - c. The primary water heating equipment cannot satisfy the system load due to equipment failure or entering air temperature below 40°F.
5. Supplemental heating downstream from a multi-pass HPWH system.
6. Stand-alone electric water heaters serving single zones not served by the central water heating system.

**A new section, Section C404.2.3.5 is added and shall read as follows:**

**C404.2.3.5 Alarms.** The control system shall be capable of and configured to send automatic error alarms to building or maintenance personnel upon detection of equipment faults, low leaving water temperature from primary storage tanks, or low hot water supply delivery temperature to building distribution system.

**Table C404.3.1 is amended to read as follows:**

**TABLE C404.3.1  
 PIPING VOLUME AND MAXIMUM PIPING LENGTHS**

NOMINAL PIPE SIZE (inches)	VOLUME (liquid ounces per foot length)	MAXIMUM PIPING LENGTH (feet)	
		Public lavatory faucets	Other fixtures and appliances
¼	0.33	6	50
5/16	0.5	4	50
3/8	0.75	3	50
½	1.5	2 8	43
5/8	2	4 8	32
¾	3	0.5	21
7/8	4	0.5	16
1	5	0.5	13

11/4	8	0.5	8
11/2	11	0.5	6
2 or larger	18	0.5	4

**Section C404.4 is amended to read as follows:**

**C404.4 Heat traps for hot water storage tanks.** Storage tank-type water heaters and hot water storage tanks that have vertical water pipes connecting to the inlet and outlet of the tank shall be provided with integral heat traps such vertical at those inlets and outlets or shall have pipe-configured heat traps in the piping connected to those inlets and outlets. Tank inlets and outlets associated with solar water heating system circulation loops shall not be required to have heat traps.

**A new Section, Section C404.6.1 is added and shall read as follows:**

**C404.6.1 Storage tank insulation.** Unfired storage tanks used to store service hot water at temperatures above 130°F shall be wrapped with an insulating product, installed in accordance with the insulation manufacturer's instructions and providing a minimum of R-2 additional insulation for every 10°F increase in stored water temperature above 130°F. Such additional insulation is also permitted to be integral to the tank. The insulation is permitted to be discontinuous at structural supports.

**Section C404.7.1 shall be amended to read as follows:**

**C404.7.1 Circulation systems.** Heated-water circulation systems shall be provided with a circulation pump. The system return pipe shall be a dedicated return pipe. Gravity and thermo-syphon circulation systems shall be prohibited. Controls shall start the pump based on the identification of a demand for hot water within the occupancy, according to the requirements of Sections C404.7.1.1 and C404.7.1.2.

**C404.7.1.1 Single riser systems.** Where the circulation system serves only a single domestic hot water riser or zone, the following controls shall be provided:

1. Control to automatically turn off the pump when the water in the circulation loop is at the supply temperature and shall not turn the pump back on until the temperature is a minimum of 10°F lower than the supply temperature or have controls equipped with *automatic* time switches or other controls that can be set to switch off the pump during unoccupied hours when hot water is not required.
2. Control shall be equipped with manual switch or other controls that can be used to turn off the pump during extended periods when hot water is not required.

**C404.7.1.2 Multiple riser systems.** Where the circulation system serves multiple domestic hot water risers or piping zones, controls shall be provided such that they can be set to switch off the pump during extended periods when hot water is not required. System shall include means for balancing the flow rate through each individual hot water supply riser or piping zone. For heated water circulation systems that have multiple risers and use a variable flow circulation pump, each riser shall have a self-actuating thermostatic balancing valve.

**C404.7.1.3 Electronic thermostatic mixing valve (TMV).** Where a heated water circulation system utilizes an electronic TMV to control the temperature of hot water supplied to the building, the TMV shall be configured so that it either reverts closed (fully COLD) or maintains its current valve position upon power failure or cessation of circulation flow.

**A new section C404.7.3.1 is added and shall read as follows:**

**C404.7.3.1 Pipe insulation.** For heated water circulation systems, both supply and return pipe insulation shall be at minimum 1.0 inch thicker than that required by Table C403.10.3.

**Exception.** Where piping is centered within a wall, ceiling, or floor framing cavity with a depth at least 4" greater than the diameter of the pipe and that is completely filled with batt or blown-in insulation, additional pipe insulation is not required.

**Section C404.8 is added to read as follows:**

**C404.8 Demand recirculation controls.** ~~Demand recirculation water systems are not permitted.~~ shall have controls that comply with both of the following:

- ~~1. The controls shall start the pump upon receiving a signal from the action of a user of a fixture or appliance, sensing the presence of a user of a fixture or sensing the flow of hot or tempered water to a fixture fitting or appliance.~~
- ~~2. The controls shall limit the temperature of the water entering the cold water piping to not greater than 104°F (40°C)~~

**Section C404.11.1 is amended to read as follows:**

**C404.11.1 Heaters.** Pool water heaters using electric resistance heating as the primary source of heat are prohibited for pools over 2,000 gallons. Heat pump pool heaters shall have a minimum COP of 4.0 at 50°F db, 44.2°F wb outdoor air and 80°F entering water, determined in accordance with ASHRAE Standard 146 AHRI Standard 1160, Performance Rating of Heat Pump Pool Heaters. Other pool heating equipment shall comply with the applicable efficiencies in Section C404.2.

The electric power to all heaters shall be controlled by an on-off switch that is an integral part of the heater, mounted on the exterior of the heater, or external to and within 3 feet of the heater in a location with ready access. Operation of such switch shall not change the setting of the heater thermostat. Such switches shall be in addition to a circuit breaker for the power to the heater. Gas fired heaters shall not be equipped with constant burning pilot lights.

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**SECTION C405  
ELECTRICAL POWER AND LIGHTING SYSTEMS**

**Section C405.1 is amended to read as follows:**

**C405.1 General.** This section covers lighting system controls, the maximum lighting power for interior and exterior applications, electrical energy consumption, vertical and horizontal transportation systems, and minimum efficiencies for motors and transformers. Receptacles shall be controlled according to Section C405.10. Controlled receptacles and lighting systems shall be commissioned according to Section C405.12. Solar readiness shall be provided according to Section C411 and renewable energy shall be provided according to Section C412.

*Dwelling units* within multi-family buildings shall comply with Sections C405.1.1 and C405.7. All other dwelling units in dormitory, hotel and other residential occupancies that are not classified as multi-family residential occupancies shall comply with Section C405.2.5 and Section C405.1.1 or Section C405.4. *Sleeping units* shall comply with Section C405.2.5 and Section C405.1.1 or Section C405.4.

Lighting installed in *walk-in coolers, walk-in freezers, refrigerated warehouse coolers and refrigerated warehouse freezers* shall comply with the lighting requirements of Section C410.2.

Transformers, uninterruptable power supplies, motors and electrical power processing equipment in *data center* systems shall comply with Section 8 of ASHRAE Standard 90.4 in addition to this code.

**Section C405.2 is amended to read as follows:**

**C405.2 Lighting controls.** Lighting systems shall be provided with controls that comply with ~~one~~ Item 1 or Item 2 of the following:

1. Lighting controls as specified in Sections C405.2.1 through C405.2.7. In addition, any contiguous open office area larger than 5,000 square feet shall have its general lighting controlled by either:
  - 1.1. An enhanced digital lighting control system conforming to the requirements of Section C406.4;
  - or
  - 1.2. Luminaire-level lighting controls (LLLC) conforming to the requirements in Item 2 of this subsection.
2. Luminaire level lighting controls (LLLC) for all areas and lighting controls as specified in Sections C405.2.1, C405.2.3 and C405.2.5. The LLLC luminaires shall be independently configured to:
  - 2.1 Monitor occupant activity to brighten or dim lighting when occupied or unoccupied, respectively.
  - 2.2 Monitor ambient light, both electric and daylight, and brighten or dim artificial light to maintain desired light level. A maximum of 8 fixtures are permitted to be controlled together to maintain uniform light levels within a single daylight zone.
  - 2.3 For each control strategy, be capable of configuration and re-configuration of performance parameters including: bright and dim set points, timeouts, dimming fade rates, sensor sensitivity adjustments, and wireless zoning configuration.

**Exception to Section C405.2:** Except for specific application controls required by Section C405.2.5, lighting controls are not required for the following:

1. Areas designated as security or emergency areas that are required to be continuously lighted.
2. Means of egress illumination serving the exit access that does not exceed ~~0.02~~ 0.01 watts per square foot of building area is exempt from this requirement.
3. Emergency egress lighting that is normally off.
4. Industrial or manufacturing process areas, as may be required for production and safety.

**Section 405.2.1.3 is amended to read as follows:**

**C405.2.1.3 Occupant sensor control function in open plan office areas.** Occupant sensor controls in open plan office spaces less than 300 square feet (28 m<sup>2</sup>) in area shall comply with Section C405.2.1.1. Occupant sensor controls in all other open plan office spaces shall be configured to comply with all of the following:

1. General lighting is controlled separately in control zones with floor areas not greater than 600 square feet (55 m<sup>2</sup>) within the open plan office space.

2. Automatically turn off general lighting in all control zones within 20 minutes after all occupants have left the open plan office space.
3. General lighting power in each control zone is reduced by not less than 80 percent of the full zone general lighting power within 20 minutes of all occupants leaving that control zone. Control functions that switch control zone lights completely off when the zone is unoccupied meet this requirement.
4. Daylight responsive controls activate open plan office space general lighting or control zone general lighting only when occupancy for the same area is detected.
5. Lighting controls in open plan office areas larger than 5,000 square feet must also comply with Section C405.2(1).

**Section C405.2.2.1 is amended to read as follows:**

**C405.2.2.1 Time switch control function.** Time switch controls shall comply with the following:

1. Have a minimum 7 day clock.
2. Be capable of being set for 7 different day types per week.
3. Incorporate an *automatic* holiday "shut-off" feature, which turns off all controlled loads for at least 24 hours and then resumes normally scheduled operations.
4. Have program back-up capabilities, which prevent the loss of program and time settings for at least 10 hours, if power is interrupted.
5. Include an override switching device that complies with the following:
  - 5.1 The override switch shall be a manual control.
  - 5.2 The override switch, when initiated, shall permit the controlled lighting to remain on for not more than 2 hours.
  - 5.3 Any individual override switch shall control the lighting for an area not larger than ~~5,000~~ 2,500 square feet (~~465 232~~ m<sup>2</sup>).
6. Time switch controls are allowed to automatically turn on lighting to full power in corridors, lobbies, restrooms, storage rooms less than 50 square feet, and medical areas of healthcare facilities. In all other spaces, time switch controls are allowed to automatically turn on the lighting to not more than 50 percent power.

**Exception:** Within mall concourses, auditoriums, sales areas, manufacturing facilities, pools, gymnasiums, skating rinks and sports arenas:

- 1.1. The time limit shall be permitted to be greater than 2 hours provided the switch is a captive key device.
- 1.2. The area controlled by the override switch shall not be limited to 5,000 square feet (465 m<sup>2</sup>) provided that such area is less than 20,000 square feet (1860 m<sup>2</sup>).

**Section C405.2.3 is amended to read as follows:**

**C405.2.3 Manual controls.** Stairwells and parking garages are not permitted to use manual switches. All other lighting shall have manual controls complying with the following:

1. They shall be in a location with *ready access* to occupants.
2. They shall be located where the controlled lights are visible, or shall identify the area served by the lights and indicate their status.
3. Each control device shall control an area no larger than a single room or 2,500 square feet, whichever is less, if the room area is less than or equal to 10,000 square feet; or one-quarter

of the room or 10,000 square feet, whichever is less, if the room area is greater than 10,000 square feet.

**Exceptions:**

1. A manual control may be installed in a remote location for the purpose of safety or security provided each remote control device has an indicator pilot light as part of or next to the control device and the light is clearly labeled to identify the controlled lighting.
2. Restrooms.

**Section C405.2.3.1 is amended to read as follows:**

**C405.2.3.1 Light reduction controls.** Manual controls shall be configured to provide light reduction control that allows the occupant to reduce the connected lighting load between 30 and 70 percent. Lighting reduction shall be achieved by one of the following *approved* methods:

1. Controlling all lamps or luminaires.
2. Dual switching of alternate rows of luminaires, alternate luminaires or alternate lamps.
3. Switching the middle in three-lamp lamp luminaires independently of the outer lamps.
4. Switching each luminaire or each lamp.

**Exceptions:**

1. Light reduction controls are not required in daylight zones with *daylight responsive controls* complying with Section C405.2.4.
2. Where provided with manual control, the following areas are not required to have light reduction control:
  - 2.1. Spaces that have only one luminaire with a rated power of less than 100 watts.
  - 2.2. Spaces that use less than 0.6 watts per square foot (6.5 W/m<sup>2</sup>).
  - 2.3. Lighting in corridors, lobbies, electrical rooms, restrooms, storage rooms, airport concourse baggage areas, dwelling and sleeping rooms and mechanical rooms.

**Section C405.2.4 is amended to read as follows:**

**C405.2.4 Daylight responsive controls.** *Daylight responsive controls* complying with Section C405.2.4.1 shall be provided to control the lighting within *daylight zones* in the following spaces:

1. Sidelit zones as defined in Section C405.2.4.2 with more than two general lighting fixtures within the combined primary and secondary sidelit zones.
2. Toplit zones as defined in Section C405.2.4.3 with more than two general lighting fixtures within the *daylight zone*.

**Exception:** *Daylight responsive controls* are not required for the following:

1. Spaces in health care facilities where patient care is directly provided.
2. Lighting that is required to have specific application control in accordance with Section C405.2.5.
3. Sidelit zones on the first floor above grade in Group A-2 and Group M occupancies where the fenestration adjoins a sidewalk or other outdoor pedestrian area, provided that the light fixtures are controlled separately from the general area lighting.
4. *Daylight zones* where the total proposed lighting power density is less than 35 percent of the lighting power allowance per Section C405.4.2.

**Section C405.2.4.1 is amended to read as follows:**

**C405.2.4.1 Daylight responsive controls function.** Where required, *daylight responsive controls* shall be provided within each space for control of lights in that space and shall comply with all of the following:

1. Lights in primary sidelit t zones shall be controlled independently of lights in secondary sidelit zones in accordance with Section C405.2.4.2.  
**Exception:** Spaces enclosed by walls or ceiling height partitions with no more than three general lighting fixtures may have combined daylight zone control of primary and secondary *daylight zones* provided *uniform illumination* can be achieved.
2. Lights in toplit zones in accordance with Section C405.2.4.3 shall be controlled independently of lights in sidelit zones in accordance with Section C405.2.4.2.
3. *Daylight responsive controls* within each space shall be configured so that they can be calibrated from within that space by authorized personnel.
4. Calibration mechanisms shall be in a location with *ready access*.
5. *Daylight responsive controls* shall be configured to completely shut off all controlled lights in that zone.
6. Lights in sidelit zones in accordance with Section C405.2.4.2 facing different cardinal orientations (i.e., within 45 degrees of due north, east, south, west) shall be controlled independently of each other.

**Exception:** Up to two light fixtures in each space are permitted to be controlled together with lighting in a *daylight zone* facing a different cardinal orientation.

7. Incorporate time-delay circuits to prevent cycling of light level changes of less than three minutes.
8. The maximum area a single *daylight responsive control* device serves shall not exceed 2,500 square feet (232 m<sup>2</sup>) and no more than 60 lineal feet (18.3 m) of facade.
9. Occupant override capability of daylight dimming controls is not permitted, other than a reduction of light output from the level established by the daylighting controls.
10. *Daylight responsive controls* shall be set initially to activate at 30 footcandles (323 lux) or not more than 110 percent of the illuminance level specified on the construction documents.

**Section C405.2.5 is amended to read as follows:**

**C405.2.5 Additional lighting controls.** Specific application lighting shall be provided with controls, in addition to controls required by other sections, for the following:

1. The following lighting shall be controlled by an occupant sensor complying with Section C405.2.1.1 or a time-switch control complying with Section C405.2.2.1 In addition, a manual control shall be provided to control such lighting separately from the general lighting in the space:
  - 1.1. Display and accent.
  - 1.2. Lighting in display cases.
  - 1.3. Supplemental task lighting, including permanently installed under-shelf or under-cabinet lighting.
  - 1.4. Lighting equipment that is for sale or demonstration in lighting education.



2. *Sleeping units* shall have control devices or systems configured to automatically switch off all permanently installed luminaires and switched receptacles, including those installed within furniture, within 20 minutes after all occupants have left the unit.

**Exceptions:**

1. Lighting and switched receptacles controlled by card key controls.
2. Spaces where patient care is directly provided.
3. Permanently installed luminaires within *dwelling units* shall be provided with controls complying with either Section C405.2.1.1 or C405.2.3.1.
4. Lighting for nonvisual applications, such as plant growth and food warming, shall be controlled by a dedicated control that is independent of the controls for other lighting within the room or space. ~~Each control zone shall be no greater than the area served by a single luminaire or 4,000 square feet, whichever is larger.~~
5. Luminaires serving the exit access and providing means of egress illumination required by Section 1006.1 of the *International Building Code*, including luminaires that function as both normal and emergency means of egress illumination shall be controlled by a combination of listed emergency relay and occupancy sensors, or signal from another building control system, that automatically shuts off the lighting when the areas served by that illumination are unoccupied.

**Exception:** Means of egress illumination serving the exit access that does not exceed ~~0.02~~ 0.01 watts per square foot of building area is exempt from this requirement.

**Section C405.2.6.2 is amended to read as follows:**

**C405.2.6.2 Facade and landscape lighting shutoff.** Building façade and landscape lighting shall be configured to automatically shut off ~~for a minimum of 6 hours per night or from not later than one hour after business closing to not earlier than one hour before business opening, whichever is less~~ between midnight or business/facility closing, whichever is later, and 6 a.m. or business/facility opening, whichever is earlier.

**Exception:** Areas where an *automatic* shutoff would endanger safety or security.

**Section C405.4.1 is amended to read as follows:**

C405.4.1 Total connected interior lighting power. The total connected interior lighting power shall be determined in accordance with Equation 4-10.

As an option, in areas of the building where all interior lighting equipment is fed from dedicated lighting branch circuits, the total connected interior lighting power is permitted to be calculated as the sum of the capacities of the lighting branch circuits serving those areas. For the purposes of this section, the connected interior lighting power of a 20-ampere circuit is considered to be 16 amperes, and that of a 15-ampere circuit is 12 amperes. Use of this alternative and the boundaries of the applicable areas shall be clearly documented on the electrical construction documents.

**(Equation 4-10)**

$$TCLP = [LVL + BLL + TRK + POE + Other]$$

**Where:**

- TCLP* = Total connected lighting power (watts)
- LVL* = For luminaires with lamps connected directly to building power, such as line voltage lamps, the rated wattage of the lamp, which must be minimum 60 lumen/watt.
- BLL* = For luminaires incorporating a ballast or transformer, the rated input wattage of the ballast or transformer when operating the lamp.
- TRK* = For lighting track, cable conductor, rail conductor and plug-in busway systems that allow the addition and relocation of luminaires without rewiring, the wattage shall be one of the following:
1. The specified wattage of the luminaires, but not less than 16 W/lin. ft. (52 W/lin. m).
  2. The wattage limit of the permanent current-limiting devices protecting the system.
  3. The wattage limit of the transformer supplying the system.
- POE* = For other modular lighting systems served with power supplied by a driver, power supply or transformer, including but not limited to low-voltage lighting systems, the wattage of the system shall be the maximum rated input wattage of the driver, power supply or transformer published in the manufacturer's catalogs, as specified by UL 2108 or 8750. For power-over-Ethernet lighting systems, power provided to installed non-lighting devices may be subtracted from the total power rating of the power-over-Ethernet system.
- Other = The wattage of all other luminaires and lighting, sources not covered above and associated with interior lighting verified by data supplied by the manufacturer or other *approved* sources.

The connected power associated with the following lighting equipment and applications is not included in calculating total connected lighting power

1. Television broadcast lighting for playing areas in sports arenas
2. Emergency lighting automatically off during normal building operation.
3. Lighting in spaces specifically designed for use by occupants with special lighting needs including those with visual impairment and other medical and age-related issues.
4. Casino gaming areas.
5. General area lighting power in industrial and manufacturing occupancies dedicated to the inspection or quality control of goods and products.
6. Mirror lighting in dressing rooms.
7. Task lighting for medical and dental purposes that is in addition to general lighting and controlled by an independent control device.
8. Display lighting for exhibits in galleries, museums and monuments that is in addition to general lighting and controlled by an independent control device.

9. Lighting for theatrical purposes, including performance, stage, film production and video production.
10. Lighting for photographic processes.
11. Lighting integral to equipment or instrumentation and installed by the manufacturer.
12. ~~((Task lighting))~~ Lighting for plant growth or maintenance where the lamp ~~((efficacy is not less than 90 lumens per watt))~~ has a tested photosynthetic photon efficacy (PPE) per watt of not less than 1.70 micromoles per joule for greenhouses and 1.90 micromoles per joule for indoor plant growth spaces.
13. Advertising signage or directional signage.
14. Lighting for food warming.
15. Lighting equipment that is for sale.
16. Lighting demonstration equipment in lighting education facilities.
17. Lighting *approved* because of safety considerations.
18. Lighting in retail display windows, provided the display area is enclosed by ceiling-height partitions.
19. Furniture mounted supplemental task lighting that is controlled by *automatic* shutoff.
20. Exit signs.
21. Lighting used for aircraft painting.
22. Germicidal lighting that is in addition to and controlled independently from the general lighting.

The connected power associated with the following lighting equipment and applications is not included in calculating total connected lighting power

1. Television broadcast lighting for playing areas in sports arenas
2. Emergency lighting automatically off during normal building operation.
3. Lighting in spaces specifically designed for use by occupants with special lighting needs including those with visual impairment and other medical and age-related issues.
4. Casino gaming areas.
5. General area lighting power in industrial and manufacturing occupancies dedicated to the inspection or quality control of goods and products.
6. Mirror lighting in dressing rooms.
7. Task lighting for medical and dental purposes that is in addition to general lighting and controlled by an independent control device.
8. Display lighting for exhibits in galleries, museums and monuments that is in addition to general lighting and controlled by an independent control device.
9. Lighting for theatrical purposes, including performance, stage, film production and video production.
10. Lighting for photographic processes.
11. Lighting integral to equipment or instrumentation and installed by the manufacturer.
12. ~~Task lighting~~ for plant growth or maintenance where the lamp ~~efficacy is not less than 90 lumens per watt~~ has a tested photosynthetic photon efficacy (PPE) per watt of not less than 1.70 micromoles per joule for greenhouses and 1.90 micromoles per joule for indoor plant growth spaces.
13. Advertising signage or directional signage.
14. Lighting for food warming.
15. Lighting equipment that is for sale.

16. Lighting demonstration equipment in lighting education facilities.
17. Lighting approved because of safety considerations
18. Lighting in retail display windows, provided the display area is enclosed by ceiling-height partitions.
19. Furniture mounted supplemental task lighting that is controlled by automatic shutoff.
20. Exit signs.
21. Lighting used for aircraft painting.
22. Germicidal lighting that is in addition to and controlled independently from the general lighting.

**Section C405.4.2.2 is amended to read as follows:**

**C405.4.2.2 Space-by-space method.** For the Space-by-Space Method, the interior lighting power allowance is determined by multiplying the floor area of each space times the value for the space type in Table C405.4.2(2) that most closely represents the proposed use of the space, and then summing the lighting power allowances for all spaces. Tradeoffs among spaces other than covered parking areas are permitted.

Each area enclosed by partitions that are 80 percent of the ceiling height or taller shall be considered a separate space and assigned the appropriate space type from Table C405.4.2(2). If a space has multiple functions where more than one space type is applicable, that space shall be broken up into smaller subspaces, each using their own space type. Any of these subspaces that are smaller in floor area than 20 percent of the enclosed space and less than 1,000 square feet need not be broken out separately.

**Table C405.4.2(1) is amended to read as follows:**

**TABLE C405.4.2(1)  
 INTERIOR LIGHTING POWER ALLOWANCES: BUILDING AREA METHOD**

Building Area Type	LPD (w/ft <sup>2</sup> )	<u>LPD (w/ft<sup>2</sup>)</u>
Automotive facility	0.64	<u>0.58</u>
Convention center	0.64	<u>0.58</u>
Court house	0.79	<u>0.71</u>
Dining: Bar lounge/leisure	0.79	<u>0.71</u>
Dining: Cafeteria/fast food	0.72	<u>0.65</u>
Dining: Family	0.71	<u>0.64</u>
Dormitory <sup>a,b</sup>	0.46	<u>0.41</u>
Exercise center	0.67	<u>0.60</u>
Fire station <sup>a</sup>	0.54	<u>0.49</u>
Gymnasium	0.75	<u>0.68</u>

<b>Building Area Type</b>	<b>LPD (w/ft<sup>2</sup>)</b>	<b><u>LPD (w/ft<sup>2</sup>)</u></b>
Health care clinic	0.70	<u>0.63</u>
Hospital <sup>a</sup>	0.84	0.84
Hotel/motel <sup>a,b</sup>	0.56	<u>0.50</u>
Library	0.83	<u>0.75</u>
Manufacturing facility	0.82	<u>0.74</u>
Motion picture theater	0.44	<u>0.40</u>
Multifamily <sup>c</sup>	0.41	<u>0.37</u>
Museum	0.55	<u>0.50</u>
Office	0.64	<u>0.58</u>
Parking garage	0.14	<u>0.13</u>
Penitentiary	0.65	0.65
Performing arts theater	0.84	<u>0.76</u>
Police station	0.66	<u>0.60</u>
Post office	0.65	<u>0.59</u>
Religious building	0.67	<u>0.60</u>
Retail	0.84	<u>0.76</u>
School/university	0.70	<u>0.63</u>
Sports arena	0.62	<u>0.54</u>
Town hall	0.69	<u>0.62</u>
Transportation	0.50	<u>0.45</u>
Warehouse	0.40	<u>0.36</u>
Workshop	0.91	<u>0.82</u>

- a. Where sleeping units are excluded from lighting power calculations by application of Section R404.1, neither the area of the sleeping units nor the wattage of lighting in the sleeping units is counted.
- b. Where dwelling units are excluded from lighting power calculations by application of Section R404.1, neither the area of the dwelling units nor the wattage of lighting in the dwelling units is counted.
- c. Dwelling units are excluded. Neither the area of the dwelling units nor the wattage of lighting in the dwelling units is counted.

**Table C405.4.2(2) is amended to read as follows:**

**TABLE C405.4.2(2)  
 INTERIOR LIGHTING POWER ALLOWANCES: SPACE-BY-SPACE METHOD**

<b>Common Space-by-Space Types<sup>a</sup></b>	<b>LPD-w/ft<sup>2</sup></b>	<b><u>LPD (w/ft<sup>2</sup>)</u></b>
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Atrium - Less than 20 feet in height	<del>0.39</del>	<u>0.35</u>
Atrium - 20 to 40 feet in height	<del>0.48</del>	<u>0.43</u>
Atrium - Above 40 feet in height	<del>0.60</del>	<u>0.54</u>
Audience/seating area - Permanent		
In an auditorium	<del>0.64</del>	<u>0.55</u>
In a gymnasium	<del>0.23</del>	<u>0.21</u>
In a motion picture theater	<del>0.27</del>	<u>0.24</u>
In a penitentiary	<del>0.67</del>	<u>0.67</u>
In a performing arts theater	<del>1.16</del>	<u>1.04</u>
In a religious building	<del>0.72</del>	<u>0.65</u>
In a sports arena	<del>0.33</del>	<u>0.30</u>
Otherwise	<del>0.23</del>	<u>0.21</u>
Banking activity area	<del>0.64</del>	<u>0.55</u>
Breakroom (see lounge/breakroom)		
Classroom/lecture hall/training room		
In a penitentiary	<del>0.89</del>	<u>0.89</u>
Otherwise <sup>m</sup>	<del>0.74</del>	<u>0.64</u>
<i>Computer room, data center</i>	<del>0.94</del>	<u>0.85</u>
Conference/meeting/multipurpose	<del>0.97</del>	<u>0.87</u>
Confinement cell	<del>0.70</del>	<u>0.63</u>
Copy/print room	<del>0.34</del>	<u>0.28</u>
Corridor		
In a facility for the visually impaired (and not used primarily by the staff) <sup>b</sup>	<del>0.74</del>	<u>0.71</u>
In a hospital	<del>0.74</del>	<u>0.71</u>
In a manufacturing facility	<del>0.44</del>	<u>0.37</u>
Otherwise <sup>c,q</sup>	<del>0.44</del>	<u>0.37</u>
Courtroom <sup>c</sup>	<del>1.20</del>	<u>1.08</u>
Dining area		
In a penitentiary	<del>0.42</del>	<u>0.42</u>
In a facility for the visually impaired (and not used primarily by the staff) <sup>b</sup>	<del>1.27</del>	<u>1.27</u>
In a bar/lounge or leisure dining <sup>n</sup>	<del>0.86</del>	<u>0.77</u>
In cafeteria or fast food dining	<del>0.40</del>	<u>0.36</u>
In a family dining area <sup>n</sup>	<del>0.60</del>	<u>0.54</u>
Otherwise	<del>0.43</del>	<u>0.39</u>
Electrical/mechanical	<del>0.43</del>	<u>0.39</u>
Emergency vehicle garage	<del>0.52</del>	<u>0.47</u>
Food preparation	<del>1.09</del>	<u>0.98</u>
Guest room <sup>a,b</sup>	<del>0.44</del>	<u>0.37</u>
Laboratory		
In or as a classroom	<del>1.14</del>	<u>1.00</u>
Otherwise	<del>1.33</del>	<u>1.20</u>
Laundry/washing area	<del>0.53</del>	<u>0.48</u>
Loading dock, interior	<del>0.88</del>	<u>0.79</u>
Lobby <sup>c</sup>		
In a facility for the visually impaired (and not used primarily by the staff) <sup>b</sup>	<del>1.69</del>	<u>1.69</u>
For an elevator	<del>0.65</del>	<u>0.59</u>
In a hotel	<del>0.54</del>	<u>0.46</u>
In a motion picture theater	<del>0.23</del>	<u>0.21</u>
In a performing arts theater	<del>1.25</del>	<u>1.13</u>
Otherwise	<del>0.84</del>	<u>0.76</u>
Locker room	<del>0.52</del>	<u>0.47</u>
Lounge/breakroom <sup>n</sup>		
In a health care facility	<del>0.42</del>	<u>0.42</u>
Otherwise	<del>0.59</del>	<u>0.53</u>
Office		
Enclosed ≤ 250	<del>0.74</del>	<u>0.67</u>
Enclosed > 250	<del>0.66</del>	<u>0.59</u>
Open plan	<del>0.64</del>	<u>0.55</u>
Parking area, interior	<del>0.15</del>	<u>0.14</u>
Pharmacy area	<del>1.66</del>	<u>1.66</u>
Restroom		
In a facility for the visually impaired (and not used primarily by the staff) <sup>b</sup>	<del>1.26</del>	<u>1.26</u>
Otherwise <sup>n</sup>	<del>0.63</del>	<u>0.57</u>

Sales area	1.05	0.95
Seating area, general	0.23	0.21
<del>((Stairway (see space containing stairway)))</del>		
Stairwell <sup>l</sup>	0.49	0.44
Storage room		
< 50 ft <sup>2</sup>	0.54	0.46
50-100 ft <sup>2</sup>	0.38	0.34
All other storage	0.38	0.34
Vehicular maintenance	0.60	0.54
Workshop	1.26	1.13

<b>Building Specific Space-by-Space Types<sup>a</sup></b>	<b><u>LPD (w/ft<sup>2</sup>)</u></b>	<b><u>LPD (w/ft<sup>2</sup>)</u></b>
Automotive ( <u>see vehicular maintenance</u> )	0.60	
Convention center - Exhibit space	0.64	0.55
Dormitory living quarters <sup>a,b</sup>	0.50	0.45
Facility for the visually impaired <sup>b</sup>		
In a chapel (and not used primarily by the staff)	0.70	0.70
In a recreation room (and not used primarily by the staff)	1.77	1.77
Fire stations <sup>9</sup>		
Sleeping quarters	0.23	0.21
Gymnasium/fitness center		
In an exercise area	0.90	0.83
In a playing area	0.85	0.77
Health care facility		
In an exam/treatment room	1.40	1.40
In an imaging room	0.94	0.94
In a medical supply room	0.62	0.62
In a nursery	0.92	0.92
In a nurse's station	1.17	1.17
In an operating room	2.26	2.26
In a patient room <sup>9</sup>	0.68	0.68
In a physical therapy room	0.91	0.91
In a recovery room	1.25	1.25
Library <sup>f</sup>		
In a reading area <sup>n</sup>	0.96	0.86
In the stacks	1.10	0.99
Manufacturing facility		
In a detailed manufacturing area	0.80	0.72
In an equipment room	0.76	0.68
In an extra high bay area (greater than 50-foot floor-to-ceiling height)	1.42	1.28
In a high bay area (25 - 50-foot floor-to-ceiling height)	1.24	1.12
In a low bay (< 25-foot floor-to-ceiling height)	0.86	0.77
Museum		
In a general exhibition area	0.34	0.28
In a restoration room	1.10	0.99
Performing arts theater dressing/fitting room	0.41	0.37
Post office - Sorting area	0.76	0.69

Religious buildings			
	In a fellowship hall <sup>n</sup>	0.54	<u>0.49</u>
	In a worship/pulpit/choir area <sup>n</sup>	0.85	<u>0.77</u>
Retail facilities			
	In a dressing/fitting room	0.54	<u>0.46</u>
	In a mall concourse	0.82	<u>0.74</u>
Sports arena - Playing area			
	For a Class 1 facility <sup>i</sup>	2.94	<u>2.94</u>
	For a Class 2 facility <sup>j</sup>	2.04	<u>2.01</u>
	For a Class 3 facility <sup>k</sup>	4.30	<u>1.30</u>
	For a Class 4 facility <sup>l</sup>	0.86	<u>0.86</u>
Transportation			
	In a baggage/carousel area	0.39	<u>0.35</u>
	In an airport concourse	0.25	<u>0.23</u>
	At a terminal ticket counter <sup>n</sup>	0.54	<u>0.46</u>
Warehouse - Storage area			
	For medium to bulky palletized items	0.33	<u>0.30</u>
	For smaller, hand-carried items	0.69	<u>0.62</u>

Keys to Table C405.4.2(2)

For SI: 1 foot = 304.8 mm, 1 watt per square foot = 11 W/m<sup>2</sup>.

Footnotes to Table C405.4.2(2)

- a. In cases where both a common space type and a building area specific space type are listed, the building area specific space type shall apply.
- b. A facility for the visually impaired is a facility that is licensed or will be licensed by local or state authorities for senior long-term care, adult daycare, senior support or people with special visual needs.
- c. For spaces in which lighting is specified to be installed in addition to, and controlled separately from, the general lighting for the purpose of highlighting art or exhibits, provided that the additional lighting power shall not exceed 0.5 W/ft<sup>2</sup> of such spaces.
- d. RESERVED.
- e. RESERVED.
- f. RESERVED.
- g. Where sleeping units are excluded from lighting power calculations by application of Section R404.1, neither the area of the sleeping units nor the wattage of lighting in the sleeping units is counted.
- h. Where dwelling units are excluded from lighting power calculations by application of Section R404.1, neither the area of the dwelling units nor the wattage of lighting in the dwelling units is counted.
- i. Class I facilities consist of professional facilities; and semi-professional, collegiate or club facilities with seating for 5,000 or more spectators.
- j. Class II facilities consist of collegiate and semi-professional facilities with seating for fewer than 5,000 spectators; club facilities with seating between 2,000 and 5,000 spectators; and amateur league and high school facilities with seating for more than 2,000 spectators.
- k. Class III facilities consist of club, amateur league and high school facilities with seating for 2,000 or fewer spectators.
- l. Class IV facilities consist of elementary school and recreational facilities; and amateur league and high school facilities without provisions for spectators.
- m. For classrooms, additional lighting power allowance of 4.50 W/lineal foot of white or chalk boards for directional lighting dedicated to white or chalk boards.
- n. Additional lighting power allowance of 0.30 W/square foot for ornamental lighting. Qualifying ornamental lighting includes luminaires such as chandeliers, sconces, lanterns, neon and cold cathode, light emitting diodes, theatrical projectors, moving lights and light color panels when any of those lights are used in a decorative manner that does not serve as display lighting or general lighting.
- o. For scientific laboratories, additional lighting power allowance of 0.35 Watts per square foot for specialized task work – lighting that provides for small-scale, cognitive or fast performance visual tasks; lighting required for operating specialized equipment associated with pharmaceutical/laboratorial activities.



- p. For offices, additional lighting power allowance of 0.20 W/square foot for portable lighting, which includes under shelf or furniture-mounted supplemental task lighting qualifies when controlled by a time clock or an occupancy sensor.
- q. For corridors, additional lighting power allowance of 0.25 W/square foot for display lighting and decorative lighting where provided for aesthetic purposes. Decorative lighting fixtures in corridors are also permitted to provide general lighting. This additional allowance is not permitted to be used together with the allowance in footnote c for highlighting art or exhibits.

**Section C405.4.2.2.1 is amended to read as follows:**

**C405.4.2.2.1 Additional interior lighting power.** Where using the Space-by-Space Method, an increase in the interior lighting power allowance is permitted for specific lighting functions. Additional power shall be permitted only where the specified lighting is installed and automatically controlled separately from the general lighting, to be turned off during nonbusiness hours. This additional power shall be used only for the specified luminaires and shall not be used for any other purpose. An increase in the interior lighting power allowance is permitted for lighting equipment to be installed in sales areas specifically to highlight merchandise. The additional lighting power shall be determined in accordance with Equation 4-11:

$$\text{Additional interior lighting power allowance} = 500 \text{ watts} + (\text{Retail Area 1} \times 0.45 \text{ W/ft}^2) + (\text{Retail Area 2} \times 0.45 \text{ W/ft}^2) + (\text{Retail Area 3} \times 1.05 \text{ W/ft}^2) + (\text{Retail Area 4} \times 1.87 \text{ W/ft}^2)$$

**Where:**

**(Equation 4-11)**

- Retail Area 1 = The floor area for all products not listed in Retail Area 2, 3 or 4.
- Retail Area 2 = The floor area used for the sale of vehicles, sporting goods and small electronics.
- Retail Area 3 = The floor area used for the sale of furniture, clothing, cosmetics and artwork.
- Retail Area 4 = The floor area used for the sale of jewelry, crystal and china.

**Exception:** Other merchandise categories are permitted to be included in Retail Areas 2 through 4, provided that justification documenting the need for additional lighting power based on visual inspection, contrast, or other critical display requirement is *approved* by the *code official*.

**Section C405.5.2 is amended to read as follows:**

**C405.5.2 Total connected exterior building lighting power.** The total exterior connected lighting power shall be the total maximum rated wattage of all exterior lighting that is powered through the energy service for the building.

**Exception:** Lighting used for the following applications shall not be included:

1. Lighting *approved* because of safety considerations.
2. Emergency lighting automatically off during normal business operation.
3. Exit signs.
4. Specialized signal, directional and marker lighting associated with transportation.
5. Advertising signage or directional signage.
6. Integral to equipment or instrumentation and is installed by its manufacturer.
7. Theatrical purposes, including performance, stage, film production and video production.
8. Athletic playing areas.
9. Temporary lighting.
10. Industrial production, material handling, transportation sites and associated storage areas.
11. Theme elements in theme/amusement parks.
12. Lighting integrated within or used to highlight features of art, public monuments and the national flag.
13. Lighting for water features and swimming pools.
14. Lighting that is controlled from within *dwelling units*, where the lighting complies with Section R404.1.

**Section C405.5.3 is amended to read as follows:**

**C405.5.3 Exterior lighting power allowance.** The total exterior lighting power allowance is the sum of the base site allowance plus the individual allowances for areas that are to be illuminated by lighting that is powered through the energy service for the building. Covered parking garage lighting is not considered exterior lighting for the purposes of this calculation. Lighting power allowances are as specified in Table C405.5.3(2). The lighting zone for the building exterior is determined in accordance with Table C405.5.3(1) unless otherwise specified by the *code official*.

**Table C405.5.3(1) is amended to read as follows:**

**TABLE C405.5.3(1) EXTERIOR LIGHTING ZONES**

LIGHTING ZONE	DESCRIPTION
1	Developed areas of national parks, state parks, forest land, and rural areas
2	Areas predominantly consisting of residential zoning, neighborhood business districts, light industrial with limited nighttime use and residential mixed use areas
3	All other areas not classified as lighting zone 1, 2 or 4

4-(Not Used)	<del>High-activity commercial districts in major metropolitan areas as designated by the local land use planning authority</del>
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**A new Section, Section C405.5.5 is added and shall read as follows:**

**C405.5.5 Full cutoff luminaires.** For open parking and outdoor areas and roadways, luminaires mounted more than 15 feet above the ground shall have a luminaire light distribution in which zero candela intensity occurs at an angle of 90 degrees above nadir, and all greater angles from nadir.

**A new section, Section C 405.7.1 is added and shall read as follows:**

**C405.7.1 Electric receptacles at dwelling unit gas appliances.** Where *dwelling unit* appliances are served by natural gas, an electrical receptacle and circuit shall be provided at each gas appliance with sufficient capacity to serve a future electric appliance in the same location. The receptacles and circuits shall be included in the electrical service load calculation and shall meet the requirements of items 1 through 3 below. The receptacle for each gas appliance shall be located within 12 inches of the appliance and without obstructions between the appliance and the outlet. An electric receptacle is not required for a decorative gas fireplace.

1. Each gas range, cooktop, or oven, or combination appliance, location shall be served by a dedicated 240/208-volt, 40-amp receptacle connected to the *dwelling unit* electric panel with a 3-conductor branch circuit complying with 210.19(A)(3) of the electrical code and a minimum included load of 9600 VA for 240-volt systems or 8000 VA for 208-volt systems.
2. Each gas clothes dryer location shall be served by a dedicated 240/208-volt, 30-amp receptacle connected to the *dwelling unit* electric panel with a 3-conductor branch circuit and a minimum included load of 5000 VA.
3. Each gas domestic water heater location shall be served by a dedicated 240/208 volt, 30-amp outlet connected to the *dwelling unit* electrical panel with a 3-conductor branch circuit and a minimum included load of 4500 VA.

**Section C405.8 is amended to read as follows:**

**C405.8 Electric motor efficiency.** All electric motors, fractional or otherwise, shall meet the minimum efficiency requirements of Tables C405.8(1) through C405.8(4) when tested and rated in accordance with DOE 10 CFR. The efficiency shall be verified through certification under an *approved* certification program, or, where no certification program exists, the equipment efficiency rating shall be supported by data furnished by the motor manufacturer.

**Exception:** The standards in this section shall not apply to the following exempt electric motors.

1. Air-over electric motors.
2. Component sets of an electric motor.
3. Liquid-cooled electric motors.
4. Submersible electric motors.
5. Inverter-only electric motors.

Fractional hp fan motors that are 1/12 hp or greater and less than 1 hp (based on output power)

which are not covered by Tables C405.8(3) and C405.8(4) shall be electronically commutated motors or shall have a minimum motor efficiency of 70 percent when rated in accordance with DOE 10 CFR 431. These motors shall also have the means to adjust motor speed for either balancing or remote control. Belt-driven fans may use sheave adjustment for airflow balancing in lieu of a varying motor speed.

**Exceptions:**

1. Motors that are an integral part of specialized process equipment.
2. Where the motor is integral to a listed piece of equipment for which no complying motor has been *approved*.
3. Motors used as a component of the equipment meeting the minimum efficiency requirements of Section C403.3.2 and Tables C403.3.2(1) through C403.3.2(4213), provided that the motor input is included when determining the equipment efficiency.
4. Motors in the airstream within fan coils and terminal units that operate only when providing heating to the space served.
5. Fan motors that are not covered by Tables C405.8(1) through C405.8(4) and are used to power heat recovery ventilators, energy recovery ventilators, or local exhaust fans in Group R subject to the efficacy requirements of Section C403.8.4.
6. Domestic clothes dryer booster fans, range hood exhaust fans, and domestic range booster fans that operate intermittently.
7. Radon and contaminated soil exhaust fans.
8. Group R heat recovery ventilator and energy recovery ventilator fans that are less than 400 cfm.

**Section C405.9.2 is amended to read as follows:**

**C405.9.2 Escalators and moving walks.** Escalators and moving walks shall comply with ASME A17.1/CSA B44 and shall have *automatic* controls configured to reduce speed to the minimum permitted speed in accordance with ASME A17.1/CSA B44 or applicable local code when not conveying passengers.

**Exception:** A variable voltage drive system that reduces operating voltage in response to light loading conditions ~~may~~ is permitted to be provided in place ~~lieu~~ lieu of the variable speed function.

**Section C405.10 is amended to read as follows:**

**C405.10 Controlled receptacles.** At least 50 percent of all 125 volt 15- and 20-ampere receptacles installed in private offices, open offices, conference rooms, rooms used primarily for printing and/or copying functions, break rooms, individual workstations and classrooms, including those installed in modular partitions and modular office workstation systems, shall be controlled as required by this section. In rooms larger than 200 square feet (19 m<sup>2</sup>), Either split receptacles shall be provided, with the top receptacle(s) controlled, or a controlled receptacle shall be located within 72 12 inches (4.8 0.3 m) of each uncontrolled receptacle. Controlled receptacles shall be visibly differentiated from standard receptacles using the standard symbol required by the Electrical Code and shall be controlled by one of the following automatic control devices:

1. An occupant sensor that turns receptacle power off when no occupants have been detected

for a maximum of 20 minutes.

2. A time-of-day operated control device that turns receptacle power off at specific programmed times and can be programmed separately for each day of the week. The control device shall be configured to provide an independent schedule for each portion of the building not to exceed 5,000 square feet (465 m<sup>2</sup>) and not to exceed one full floor. The device shall be capable of being overridden for periods of up to two hours by a timer in a location with access to occupants. Any individual override switch shall control the *controlled receptacles* for a maximum area of 5,000 square feet (465 m<sup>2</sup>). Override switches for *controlled receptacles* are permitted to control the lighting within the same area.

**Exceptions:**

1. Receptacles designated for specific equipment requiring 24-hour operation, for building maintenance functions, or for specific safety or security equipment are not required to be controlled by an *automatic* control device and are not required to be located within ~~72~~ 12 inches of a controlled receptacle.
2. Within a single modular office workstation, non-controlled receptacles are permitted to be located more than 12 inches, but not more than 72 inches, from the controlled receptacles serving that workstation.

**City Informative Note:** The requirements of this section also apply to rooms and spaces that have substantially similar functions to those listed even when they are labeled with different names. For example, an area designed for office functions that is labeled “work room,” or a room used as a classroom that is labeled “student learning” would each be required to provide controlled receptacles.

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**SECTION C406  
EFFICIENCY PACKAGES**

**Section C406.1 is amended to read as follows:**

**C406.1 Additional energy efficiency credit requirements.** New buildings and changes in space conditioning, *change of occupancy* and building *additions* in accordance with Chapter 5 shall comply with sufficient packages from Table C406.1 so as to achieve a minimum number of ~~six~~ eight credits. Each area shall be permitted to apply for different packages provided all areas in the building comply with the requirement for ~~six~~ eight credits. Areas included in the same permit within mixed use buildings shall be permitted to demonstrate compliance by an area weighted average number of credits by building occupancy achieving a minimum number of ~~six~~ eight credits.

**Exceptions:**

1. Low energy spaces in accordance with Section C402.1.1.1 and equipment buildings in accordance with Section C402.1.2 shall comply with sufficient packages from Table C406.1 to achieve a minimum number of ~~three~~ four credits.
2. Building additions that have less than 1,000 square feet of *conditioned floor area* shall comply with sufficient packages from Table C406.1 to achieve a minimum number of ~~three~~ four credits.

**Section C406.1.1 is amended to read as follows:**

**C406.1.1 Tenant spaces.** Initial tenant improvement shall comply with sufficient packages from Table C406.1 to achieve a minimum number of ~~six~~ eight credits. In buildings with multiple tenant spaces, each tenant space is permitted to apply for different packages provided all areas in the building comply with the requirement for ~~six~~ eight credits.

**City Informative Note:** In this section “tenant space” means any conditioned area within a new building that is constructed for first occupancy under a separate permit from the shell and core permits.

**Table C406.1 is amended to read as follows:**

**TABLE C406.1 EFFICIENCY PACKAGE CREDITS**

Code Section	Commercial Building Occupancy					
	Group R-1	Group R-2	Group B	Group E	Group M	All Other
	Additional Efficiency Credits					
1. More efficient HVAC performance in accordance with Section C406.2	2.0	3.0	3.0	2.0	1.0	2.0
2. Reduced lighting power: Option 1 in accordance with Section C406.3.1	1.0	1.0	2.0	2.0	3.0	2.0
3. Reduced lighting power: Option 2 in accordance with Section C406.3.2 <sup>a</sup>	2.0	3.0	4.0	4.0	6.0	4.0
4. Enhanced lighting controls in accordance with Section C406.4	NA	NA	1.0	1.0	1.0	1.0
5. On-site supply of renewable energy in accordance with C406.5	3.0	3.0	3.0	3.0	3.0	3.0
5.1. 1/3 of renewable energy required by C406.5	1.0	1.0	1.0	1.0	1.0	1.0
5.2. 2/3 of renewable energy required by C406.5	2.0	2.0	2.0	2.0	2.0	2.0
6. Dedicated outdoor air system in accordance with Section C406.6 <sup>b</sup>	4.0	<del>4.0</del> <u>2.0</u> <sup>d</sup>	4.0	NA	NA	4.0
7. High performance dedicated outdoor air system in accordance with Section C406.7	4.0	4.0	4.0	4.0	4.0	4.0
8. High-efficiency service water heating in accordance with Sections C406.8.1 and C406.8.2	4.0 <u>NA after 1/1/2022</u>	5.0 <u>NA after 1/1/2022</u>	NA	NA	NA	8.0
9. High performance service water heating in (( <del>multi-family</del> ) R-1 and R-2 buildings in accordance with Section C406.9	7.0 prior to <u>1/1/2022</u> 5.0 after <u>1/1/2022</u>	8.0 prior to <u>1/1/2022</u> 5.0 after <u>1/1/2022</u>	NA	NA	NA	NA

10. Enhanced envelope performance in accordance with Section C406.10 <sup>c</sup>	3.0	6.0	3.0	3.0	3.0	4.0
11. Reduced air infiltration in accordance with Section C406.11 <sup>c</sup>	1.0	2.0	1.0	1.0	1.0	1.0
12. <del>Enhanced commercial kitchen equipment in accordance with Section C406.12</del>	5.0	NA	NA	NA	5.0	5.0 (Group A-2 only)

- a. Projects using this option may not use Item 2.
- b. This option is not available to buildings subject to the prescriptive requirements of Section C403.3.5 or C403.6.
- c. Buildings or building areas that are exempt from thermal envelope requirements in accordance with Sections C402.1.1 and C402.1.2 do not qualify for this package.
- d. 4.0 credits, instead of 2.0 credits, are permitted to be applied to areas of R-2 occupancy buildings other than *dwelling units*, including corridors, lobbies and tenant amenity spaces, where those areas comply with the requirements for this credit.

**Section C406.2 is amended to read as follows:**

**C406.2 More efficient HVAC equipment and fan performance.** No less than 90 percent of the total HVAC capacity serving the total *conditioned floor area* of the entire building, building addition, building area, occupancy type, or tenant space in accordance with Section C406.1.1, shall comply with Sections C406.2.1 through C406.2.3. ~~For~~ In addition, systems required to comply with Section C403.1.1, HVAC total system performance ratio, shall exceed the minimum requirement HVAC TSPR of the standard reference design by 10 percent. This credit shall not be utilized for low energy or semi-heated space conditioning categories.

**Exception:** ~~In low energy spaces complying with Section C402.1.1 and semi-heated spaces complying with Section C402.1.1.2, no less than 90 percent of the installed heating capacity is provided by electric infrared or gas-fired radiant heating equipment for localized heating applications. Stand-alone supply, return and exhaust fans shall comply with Section C406.2.3.~~

**Section C406.2.1 is amended to read as follows:**

**C406.2.1 HVAC system selection.** Equipment installed shall be types that are listed in Tables C403.3.2(1) through C403.3.2(12~~13~~) or a combination thereof. Electric resistance heating does not meet this requirement. No HVAC systems incorporating fossil fuel-fired equipment, or heat from district energy systems that are primarily heated by fossil fuel combustion, are permitted to utilize this credit.

**Exception:** Allowed equipment not listed in Tables C403.3.2(1) through C403.3.2(12):

- 1. ~~Air-to-water heat pumps.~~
- 2. ~~Heat recovery chillers.~~

**Section C406.2.2 is amended to read as follows:**

**C406.2.2 Minimum equipment efficiency.** Equipment shall exceed the minimum efficiency

requirements listed in Tables C403.3.2(1) through C403.3.2(~~4213~~) by 15 percent, in addition to the requirements of Section C403. Where multiple performance requirements are provided, the equipment shall exceed all requirements by 15 percent.

**Exceptions:**

1. Equipment that is larger than the maximum capacity range indicated in Tables C403.3.2(1) through C403.3.2(~~4213~~) shall utilize the values listed for the largest capacity equipment for the associated equipment type shown in the table.
2. Equipment complying with the exception to Section C406.2.1 is not required to comply with the minimum equipment efficiency requirement.
3. Compliance may be demonstrated by calculating a total weighted average percentage for all heating and cooling equipment combined. All equipment shall have efficiency that is no less than 5 percent better than the minimum required efficiency in Tables C403.3.2(1) through C403.3.2(~~4213~~), and the resulting weighted average percentage for all equipment performance requirements shall exceed 15 percent. Calculation shall include heating and cooling capacities for all equipment, percentage better or worse than minimum required efficiency per Tables C403.3.2(1) through C403.3.2(~~4213~~) for each performance requirement (SEER, EER/IEER, COP, HSPF, Et, Ec and AFUE), and the total weighted average efficiency percentage.
- ~~4. Hot water boilers with input capacity greater than 2,500,000 Btu/h shall be considered to comply with this section with a minimum thermal efficiency of 95 percent Et per the test procedure in 10 CFR Part 431.~~

**Section C406.3 is amended to read as follows:**

**C406.3 Reduced lighting power.** Interior lighting within the whole building, building area, occupancy type, building addition or tenant space shall comply with Section C406.3.1 or C406.3.2. Dwelling units and sleeping units within the building shall comply with Section C406.3.3.

**Section C 406.3.3 is amended to read as follows:**

**C406.3.3 Lamp fraction.** No less than 95 percent of the permanently installed light fixtures in dwelling units and sleeping units shall be provided by high efficacy lamps with a minimum efficacy of 65 lumens per watt. Where the conditioned floor area of residential dwelling units or sleeping units is separated from other building occupancies or building areas for the purposes of the C406 area weighted credit calculation, these dwelling or sleeping unit areas receive the credit weighting for reduced lighting power Option 1, referencing Section C406.3.1, in Table C406.1.

**Section C406.4 is amended to read as follows:**

**C406.4 Enhanced digital lighting controls.** ~~No~~ Not less than 90 percent of the total installed interior lighting power within the whole building, building addition or tenant space shall comply with Section C406.4.1. Open office areas subject to Section C405.2, item 1 are not permitted to take credit for this option.



**Section C406.4.1 is amended to read as follows:**

**C406.4.1 Lighting controls function.** Interior lighting shall be located, scheduled and operated in accordance with Section C405.2, and shall be configured with the following enhanced control functions:

1. Luminaires shall be configured for continuous dimming.
2. Each luminaire shall be individually addressed.

**Exceptions to Item 2:**

1. Multiple luminaires mounted on no more than 12 linear feet of a single lighting track and addressed as a single luminaire.
2. Multiple linear luminaires that are ganged together to create the appearance of a single longer fixture and addressed as a single luminaire, where the total length of the combined luminaires is not more than 12 feet.
3. No more than eight luminaires within a *daylight zone* are permitted to be controlled by a single *daylight responsive control*.
4. Luminaires shall be controlled by a digital control system configured with the following capabilities:
  - 4.1. Scheduling and illumination levels of individual luminaires and groups of luminaires are capable of being reconfigured through the system.
  - 4.2. Load shedding.
  - 4.3. In open and enclosed offices, the illumination level of overhead general illumination luminaires are configured to be individually adjusted by occupants.
  - 4.4. Occupancy sensors and *daylight responsive controls* are capable of being reconfigured through the system.
5. Construction documents shall include submittal of a Sequence of Operations, including a specification outlining each of the functions required by this section.
6. These control functions shall be commissioned in accordance with Sections C408.1 and C408.3.

**Section C 406.5 is amended to read as follows:**

**C406.5 On-site renewable energy.** In addition to the renewable energy required by Section C412 and to renewable energy used to comply with any other requirement of this code, a whole building, building addition, building area, occupancy type, or tenant space shall be provided with on-site renewable energy systems with a rated peak renewable energy generating capacity an annual production per square foot of no less than the value specified in Table C406.5 0.25 watts (or 0.85 BTU/h) per square foot of conditioned floor area based on the total conditioned floor area of the whole building, building addition or tenant space. The on-site renewable used in provided to comply with this option shall be separate from on-site renewables used as part of Section C406.7 provided to comply with C406.8 or used to qualify for any exception in this code.

**Table C406.5 is deleted in its entirety**

**TABLE C406.5  
ON-SITE RENEWABLE ENERGY SYSTEM RATING (PER SQUARE FOOT)**

<b>Building Area Type</b>	<b>kBTU per year</b>	<b>kWh per year</b>
Assembly	1.8	0.53
Dining	10.7	3.14
Hospital	3.6	1.06
Hotel/Motel	2.0	0.59
Multi-family residential	0.50	0.15
Office	0.82	0.24
Other	2.02	0.59
Retail	1.34	0.38
School/University	1.17	0.34
Supermarket	5.0	1.47
Warehouse	0.43	0.13

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**Section C406.6 is amended to read as follows:**

**C406.6 Dedicated outdoor air system (DOAS).** No less than 90 percent of the total *conditioned floor area* of the whole building, building area, occupancy type, building addition or tenant space, excluding floor area of unoccupied spaces that do not require ventilation per the *International Mechanical Code*, shall be served by DOAS installed in accordance with Section C403.3.5. This option is not available to buildings subject to the prescriptive requirements of Section C403.3.5. No HVAC systems incorporating fossil fuel-fired equipment, or heat from district energy systems that are primarily heated by fossil fuel combustion, are permitted to utilize this credit.

**Section C406.7 is amended to read as follows:**

**C406.7 High performance dedicated outdoor air system (DOAS).** A whole building, building area, occupancy type, building addition or tenant space which includes a DOAS complying with Section C406.6 shall also provide minimum sensible effectiveness of heat recovery of 80 percent and DOAS total combined fan power less than 0.5 W/cfm of outdoor air. For the purposes of this section, total combined fan power includes all supply, exhaust, recirculation and other fans utilized for the purpose of ventilation. No HVAC systems incorporating fossil fuel-fired equipment, or heat from district energy systems that are primarily heated by fossil fuel combustion, are permitted to utilize this credit.

**Section C406.8 is amended to read as follows:**

**C406.8 Reduced energy use in service water heating.** Buildings with service hot water heating equipment that serves the whole building, *building addition* or tenant space shall comply with Sections C406.8.1 and C406.8.2. No service water heating systems incorporating fossil fuel-fired equipment, or heat from district energy systems that are primarily heated by fossil fuel combustion, are permitted to utilize this credit.

**Section C 406.8.1 is amended to read as follows:**

**C406.8.1 Building type.** Not less than 90 percent of the *conditioned floor area* of the whole building, building area, occupancy type, building addition or tenant space shall be of the following types:

1. Group R-1: Boarding houses, hotels or motels. (Not applicable after 1/1/2022)
2. Group I-2: Hospitals, psychiatric hospitals and nursing homes.
3. Group A-2: Restaurants and banquet halls or buildings containing food preparation areas.
4. Group F: Laundries.
5. Group R-2. (Not applicable after 1/1/2022)
6. Group A-3: Health clubs and spas.
7. Buildings with a service hot water load of 10 percent or more of total building energy loads, as shown with an energy analysis as described in Section C407 or as shown through alternate service hot water load calculations showing a minimum service water energy use of 15 k/Btu per square foot per year, as approved by the building official.

**Section C406.8.1 is amended to read as follows:**

**C406.8.2 Load fraction.** Not less than 60 percent of the annual service hot water heating energy use, or not less than 100 percent of the annual service hot water heating energy use in buildings with water-cooled systems subject to the requirements of Section C403.9.5 or qualifying for one of its exceptions, shall be provided by one or more of the following:

1. Service hot water system delivering heating requirements using heat pump technology with a minimum COP of 3.0. For air-source equipment, the COP rating will be reported at the design leaving heat pump water temperature with an entering air temperature of 60°F (15.6°C) or lower. For water-source equipment, the COP rating will be reported at the design leaving load water temperature with an entering water temperature of 74°F (23.3°C) or lower.
2. Waste heat recovery from service hot water, heat recovery chillers, building equipment, process equipment, or other *approved* system. Qualifying heat recovery must be above and beyond heat recovery required by other sections of this code.
3. On site renewable energy water-heating systems, where those systems are in addition to the renewable energy required by Section C412 and any renewable energy used to comply with other requirements of this code.

**Section C406.9 is amended to read as follows:**

**C406.9 High performance service water heating in hotels and multifamily buildings.** For a whole building, building area, occupancy type, building addition, or tenant space with not less than 90 percent of the conditioned floor area being Group R-1 or R-2 occupancy, not less than 90 percent of the annual building service hot water energy use shall be provided by a heat pump system with a minimum COP of 3.0 meeting the requirements of Section C404.2.3 plus the following:

1. The refrigerant used in the heat pump system shall have a global warming potential (GWP) no greater than 675.
2. No electric resistance heating capacity shall be provided.

**Exceptions to item 2.**

1. Electric resistance heating is permitted for circulating system temperature maintenance and heat tracing of service hot water supply and return piping.
2. On-demand electric resistance water heaters for hand washing facilities are permitted in public toilet rooms.

Prior to January 1, 2022, this efficiency package is allowed be taken in addition to Section C406.8-2.

**Section C406.10 is amended to read as follows:**

**C406.10 Enhanced envelope performance.** The Proposed Total UA of the thermal envelope of the whole building, building area, occupancy type or building *addition* shall be 15 percent lower than the Allowable Total UA for an area of identical configuration and fenestration area in accordance with Section C402.1.5 and Equation 4-2. Where exception 3 for Section C412 is also being used, the Proposed Total UA shall be 30 percent lower than the than the Allowable Total UA as defined in Section C402.1.5.

**Section C406.11 is amended to read as follows:**

**~~C406.11 Reduced air infiltration leakage.~~** Measured air infiltration of the total *conditioned floor area* of the whole building, fully isolated building *addition or tenant space*, building area, or occupancy type shall comply with Section C406.11.1.

**Section C406.11.1 is amended to read as follows:**

**C406.11.1 Air leakage testing and verification.** Air ~~infiltration~~ leakage shall be verified by whole building pressurization testing conducted in accordance with ASTM E779 or ASTM E1827, or an equivalent method approved by the code official, by an independent third party. The measured air leakage rate of the *building envelope* shall not exceed 0.17 cfm/ft<sup>2</sup> under a pressure differential of 0.3 in. water (75 Pa), with the calculated surface area being the sum of the above and below grade building envelope. A report that includes the tested surface area, floor area, air by volume, stories above grade, and leakage rates shall be submitted to the *code official* and the building owner.

**~~Exception:~~** ~~Where the conditioned floor area of the building is not less than 250,000 ft<sup>2</sup> (25,000 m<sup>2</sup>), air leakage testing shall be permitted to be conducted on representative above grade sections of the building provided the conditioned floor area of tested areas is no less than 25 percent of the conditioned floor area of the building and are tested in accordance with this section.~~

**The following Informative Note shall be added to C406.11**

<b>City Informative Note:</b> Energy Star commercial kitchen equipment is required for all commercial kitchen projects by Section C403.15.
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**Section C406.12 is deleted in its entirety.**

**~~C406.12 Enhanced commercial kitchen equipment.~~** ~~For buildings and spaces designated as Group A-2, or facilities whose primary business type involves the use of a commercial kitchen with at least one gas or electric fryer, all fryers, dishwashers, steam cookers and ovens shall comply with all of the following:~~

- ~~1. Achieve the ENERGY STAR label in accordance with the specifications current as of January 1, 2018.~~
- ~~2. Be installed prior to the issuance of the certificate of occupancy.~~
- ~~3. Have the ENERGY STAR qualified model number listed on the construction documents submitted for permitting.~~

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**SECTION C407  
TOTAL BUILDING PERFORMANCE**

**Section C407.2 is amended to read as follows:**

**C407.2 Mandatory requirements.** Compliance with ~~this section C407~~ also requires compliance with those sections shown in Table C407.2.

The building permit application for projects utilizing this method shall include in one submittal all building and mechanical drawings and all information necessary to verify that the building envelope and mechanical design for the project corresponds with the annual energy analysis. If credit is proposed to be taken for lighting energy savings, then an electrical permit application shall also be submitted and approved prior to the issuance of the building permit. If credit is proposed to be taken for energy savings from other components, then the corresponding permit application (e.g., plumbing, boiler, etc.) shall also be submitted and approved prior to the building permit application. Otherwise, components of the project that would not be approved as part of a building permit application shall be modeled the same in both the proposed building and the *standard reference design* and shall comply with the requirements of this code.

**Section C407.3 is amended to read as follows:**

**C407.3 Performance-based compliance.** Compliance with this section requires compliance with ASHRAE Standard 90.1 Appendix G, Performance Rating Method, in accordance with Standard 90.1 Section 4.2.1 with the following modifications..

1. The mandatory requirements of Section G1.2.1a of Standard 90.1 are not required to be met.
2. The reduction in annual carbon emissions of the proposed building design associated with on-site renewable energy shall not be more than 3 percent of the total carbon emissions of the baseline building design. This limitation only applies to onsite renewable energy provided in excess of the renewable energy required by Section C412.
  - a. The equation  $PCI + [(PBP_{nre} - PBP)/BBP] - 0.05 < PCI$  in Section 4.2.1.1 shall be modified to read  $PCI + [(PBP_{nre} - PBP)/BBP] - 0.03 < PCI$ .
  - b. The term  $PBP_{nre}$  shall be defined as the proposed building performance without credit for reduced annual energy emissions from on-site renewable energy generation system capacity in excess of that installed to satisfy the requirements of Section C412.
3. References to energy cost in Section 4.2.1.1 and Appendix G shall be replaced by carbon emissions calculated by multiplying site energy consumption by the carbon emission factor from Table C407.3(1).
4. The building performance factors in Table C4.2.1.1 shall be replaced with those in Table C407.3(2).
5. Schedules and plug and process loads shall be modeled using the default values listed in Appendix B or in the ASHRAE 90.1 User's Manual and shall be assumed to be identical in the proposed design and baseline building design.

**Exception to item 5.** Alternative schedules and plug and process loads shall be permitted where approved by the code official.
6. Documentation requirements in Section G1.3.2.d shall be replaced by a list showing compliance with the mandatory provisions of Table C407.2.
7. Documentation requirements in Section G1.3.2.e shall be replaced by a list of aspects of the proposed design that are less stringent than the prescriptive requirements of the Energy

Code.

8. References to yet-to-be-designed future building components in the Proposed Building Performance column of Table G3.1 shall be modified to reference the corresponding sections of the Energy Code in lieu of the requirements of Standard 90.1, in the following sections of the table:
- 1. Design Model, subclause c.
  - 6. Lighting, subclause c
  - 11. Service Water-Heating Systems, subclause c.
  - 12. Receptacle and Other Loads, subclause b.
9. HVAC Systems, subclauses c and d of Table G3.1, shall meet the following requirements:
- a. For yet-to-be-designed systems in office, retail, library, education, and multifamily buildings and occupancies subject to the TSPR requirements of Section C403.1.1, the system type and efficiency parameters shall meet but not exceed those shown in Table D602.11 Standard Reference Design HVAC Systems.
  - b. For all other buildings and occupancies, the system type shall be the same as the system modeled in the baseline design and shall comply with but not exceed the requirements of Section C403 in lieu of Standard 90.1.
  - c. For HVAC systems serving future tenant spaces, where the current building permit applies to only a portion of an HVAC system, and future components will receive HVAC services from systems included in the current building permit, those future components shall be modeled as the type required to complete the HVAC system portions under the current permit and shall meet but not exceed the requirements found in Section C403.

**City Informative Note.** The permit applicant is encouraged to schedule a pre-application meeting to discuss the modeling approach for any yet-to-be designed areas that are not included in the C407 permit submissions. In general, future permit submissions should not contribute energy savings to the C407 submission beyond prescriptive code requirements, assuming use of the base building HVAC systems. Future systems must be modeled for the base building permit as being no better than the current prescriptive code, because plans often change and the City does not have a mechanism for ensuring that future tenant projects meet any beyond-code performance modeled in the original C407 submission.

**Table C407.2 is amended to read as follows:**

**TABLE C407.2  
 MANDATORY COMPLIANCE MEASURES  
 FOR TOTAL BUILDING PERFORMANCE METHOD<sup>a</sup>**

Section	Title	Comments
<b>Envelope</b>		
C402.5	Air Leakage	
<b>Mechanical</b>		
C403.1.2	Calculation of heating and cooling loads	
C403.1.3	<i>Data centers</i>	
C403.1.4	<u>Use of electric resistance and fossil fuel-fired heating equipment</u>	
C403.2	System design	

C403.3.1	Equipment and system sizing	
C403.3.2	HVAC equipment performance requirements	
C403.3.6	Ventilation for Group R occupancy	
<u>C403.3.7</u>	<u>Hydronic system flow rate</u>	
C403.4	HVAC system controls	
C403.4.1	Thermostatic controls	Except for C403.4.1.4
C403.4.2	Off-hour controls	Except for Group R
C403.4.7	Combustion heating equipment controls	
C403.4.8	Group R-1 hotel/motel guestrooms	See Section C403.7.4
C403.4.9	Group R-2 and R-3 <i>dwelling units</i>	
C403.4.10	Group R-2 sleeping units	
C403.4.11	Direct digital control systems,	
<u>C403.4.12</u>	<u>Pressure independent control valves</u>	
C403.5.5	Economizer fault detection and diagnostics (FDD)	
C403.7	Ventilation and exhaust systems	Except for C403.7.6
C403.8	Fan and fan controls	
<u>C403.9.1</u>	<u>Heat rejection equipment (partial)</u>	<u>Only the prohibition on single-pass water cooling systems is mandatory</u>
C403.9.1.1	Variable flow controls	For cooling tower fans $\geq 7.5$ hp
C403.9.1.2	Limitation on centrifugal fan cooling towers	For open cooling towers
C403.10	Construction of HVAC elements	
C403.11	Mechanical systems located outside of the <i>building thermal envelope</i>	
<u>C403.15</u>	<u>Commercial food service</u>	
<b>Service Water Heating</b>		
C404	Service Water Heating	
<b>Lighting and Electrical</b>		
C405.1	General	
C405.2	Lighting controls	
C405.3	Exit signs	
C405.4	Interior lighting power	
C405.5	Exterior building lighting power	
C405.6	Electrical transformers	
C405.7	<i>Dwelling unit</i> energy consumption	
C405.8	Electric motor efficiency	
C405.9	Vertical and horizontal transportation	
C405.10	<i>Controlled receptacles</i>	
C405.11	Voltage drop in feeders	
<b>Other Requirements</b>		
<b>Section</b>	<b>Title</b>	<b>Comments</b>
C407	Total Building Performance	
C408	System commissioning	
C409	Energy metering	
C410	Refrigeration requirements	
C411	Solar readiness	
<u>C412</u>	<u>Renewable energy</u>	<u>All on-site renewable energy production is included in the proposed building</u>



		<u>performance, but not in the baseline building performance.</u>
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**Table C407.3(1) is amended to read as follows:**

TABLE C407.3(1) CARBON EMISSIONS FACTORS

Type	CO2e (lb/unit)	Unit
Electricity	0.70	kWh
Natural Gas	11.7	Therm
Oil	19.2	Gallon
Propane	10.5	Gallon
Other <sup>a</sup>	195.00	mmBtu
On-site renewable energy <sup>b</sup>	0.00	

- a. District energy systems may use alternative emission factors supported by calculations approved by the *code official*.
- b. The TSPR calculation does not separately account for the use of renewable energy.

**Table C407.3(2) is amended to read as follows:**

TABLE C407.3(2)  
 BUILDING PERFORMANCE FACTORS (BPF)  
 TO BE USED FOR COMPLIANCE WITH SECTION C407.3

Building Area Type	Building Performance Factor
Multifamily	<del>0.58</del> <u>0.52</u>
Healthcare/hospital	<del>0.54</del> <u>0.49</u>
Hotel/motel	<del>0.64</del> <u>0.58</u>
Office	<del>0.56</del> <u>0.51</u>
Restaurant	<del>0.70</del> <u>0.63</u>
Retail	<del>0.47</del> <u>0.43</u>
School	<del>0.36</del> <u>0.32</u>
Warehouse	<del>0.48</del> <u>0.43</u>
All Others	<del>0.54</del> <u>0.49</u>

**Section C407.3.1 is amended to read as follows:**

**C407.3.1 Limits on ~~non-mandatory measures~~ substandard building envelopes.** The Proposed Total UA of the proposed building shall be no more than 20 10 percent higher than the Allowed Total UA as defined in Section C402.1.5. Where either Section C402.4.1.1.1 or C402.4.1.1.2 is used to establish the maximum allowable fenestration area for compliance with this section, all of the requirements of the selected section shall be met.

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**Section C408.1 shall be amended to read as follows:**

**C408.1 General.** A building commissioning process led by a *certified commissioning professional* and functional testing requirements shall be completed for mechanical systems in Section C403; service water heating systems in Section C404; controlled receptacle and lighting control systems in Section C405; equipment, appliance and systems installed to comply with Section C406 or C407; energy metering in Section C409; and refrigeration systems in Section C410.

**Exception:** Buildings, or portions thereof, which are exempt from Sections C408.2 through C408.7 may be excluded from the commissioning process.

1. Mechanical systems are exempt from the commissioning process where the installed total mechanical equipment capacity is less than 240,000 Btu/h cooling capacity and less than 300,000 Btu/h heating capacity.
2. Service water heating systems are exempt from the commissioning process in buildings where the largest service water heating system capacity is less than 200,000 Btu/h and where there are no pools or permanent spas.
3. Lighting control systems are exempt from the commissioning process in buildings where both the total installed lighting load is less than 20 kW and the lighting load controlled by occupancy sensors or *automatic* daylighting controls is less than 10 kW.
4. Refrigeration systems are exempt from the commissioning process if they are limited to self-contained units.

**Section C408.4 is amended to read as follows:**

**C408.4 Controlled receptacle and lighting control system commissioning.** Controlled receptacles and lighting control systems subject to Section C405 shall be included in the commissioning process required by Section C408.1. The configuration and function of controlled receptacles and lighting control systems required by this code shall be tested and shall comply with Section C408.4.1.

**Exception:** Lighting control systems and controlled receptacles are exempt from the commissioning process in buildings where:

1. The total installed lighting load is less than 20 kW, and
2. The lighting load controlled by occupancy sensors or *automatic* daylighting controls is less than 10 kW.

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**SECTION C409  
ENERGY METERING AND ENERGY CONSUMPTION MANAGEMENT**

**Section C409.1 is amended to read as follows:**

**C409.1 General.** All new buildings and additions shall have the capability of metering source energy for on-site renewable energy production in accordance with Section C409.2.4 and the end-use energy usage for electric vehicle charging in accordance with Section C409.3.4. New buildings and additions with a gross *conditioned floor area* over ~~50,000~~ 20,000 square feet shall comply with Section C409. Buildings shall be equipped to measure, monitor, record and display energy consumption data for each energy source and end use category per the provisions of this section, to enable effective energy

management. For Group R-2 buildings, the floor area of *dwelling units* and sleeping units shall be excluded from the total *conditioned floor area* for the purposes of determining the 20,000 square foot threshold. *Alterations* and *additions* to existing buildings shall conform to Section C506.

**Exceptions:**

1. Tenant spaces smaller than ~~50,000 ft<sup>2</sup>~~ 20,000 square feet within buildings if the tenant space has its own utility service and utility meters.
2. Buildings in which there is no gross *conditioned floor area* over ~~25,000~~ 10,000 square feet, including building common area, that is served by its own utility services and meters.

**Section C409.1.2 is amended to read as follows:**

**C409.1.2 Conversion factor.** Any threshold stated in kW or kVA shall include the equivalent BTU/h heating and cooling capacity of installed equipment at a conversion factor of 3,412 Btu per kW ~~at 50 percent demand~~ or 2,730 Btu per kVA.

**Section C409.2.1 is amended to read as follows:**

**C409.2.1 Electrical energy.** This category shall include all electrical energy supplied to the building and its associated site, including site lighting, parking, recreational facilities, and other areas that serve the building and its occupants.

**Exception:** Where site lighting and other exterior non-building electrical loads are served by an electrical service and meter that are separate from the building service and meter, the metering data from those loads is permitted to be either combined with the building's electrical service load data or delivered to a separate *data acquisition system*.

**Section 409.2.4 is amended to read as follows:**

**C409.2.4 Site-generated renewable energy.** This category shall include all net energy generated from on- site solar, wind, geothermal, tidal or other natural sources, and waste heat reclaimed from sewers or other off-site sources. For buildings exempt from data collection systems, the data from these meters is permitted to either be stored locally using a manual totalizing meter or other means at the meter or fed into a central data collection system.

**Section C409.3 is amended to read as follows:**

**C409.3 End-use metering.** Meters shall be provided to collect energy use data for each end-use category listed in Sections C409.3.1 through C409.3.7. These meters shall collect data for the whole building or for each separately metered portion of the building where not exempted by the exception to Section C409.1. Not more than 10 percent of the total connected load of any of the end-use metering categories in Sections C409.3.1 through C409.3.6 is permitted to be excluded from that end-use data collection. Not more than 10 percent of the total connected load of any of the end-use metering categories in Sections C409.3.1 through C409.3.6 is permitted to consist of loads not part of that category. Multiple meters may be used for any end-use category, provided that the data acquisition system totals all of the energy used by that category. Full-floor tenant space submetering data shall be provided to the tenant in accordance with Section C409.7, and the data shall not be

required to be included in other end-use categories.

**Exceptions:**

1. HVAC and service water heating equipment serving only an individual dwelling unit or sleeping unit does not require end-use metering.
2. Separate metering is not required for fire pumps, stairwell pressurization fans or other life safety systems that operate only during testing or emergency.
3. End use metering is not required for individual tenant spaces not exceeding 2,500 square feet in floor area when a dedicated source meter meeting the requirements of Section C409.4.1 is provided for the tenant space.
4. Healthcare facilities with loads in excess of 150 kVA are permitted to have submetering that measures electrical energy usage in accordance with the normal and essential electrical systems except that submetering is required for the following load categories:
  - 4.1. HVAC system energy use in accordance with the requirements of Section C409.3.1.
  - 4.2. Service water heating energy use in accordance with the requirements of Section C409.3.2.
  - 4.3. Process load system energy in accordance with the requirements of Section C409.3.56 for each significant facility not used in direct patient care, including but not limited to, food service, laundry and sterile processing facilities, where the total connected load of the facility exceeds 100 kVA.
5. End-use metering is not required for electrical circuits serving only land guest suites within Group R-1 occupancies. This exception does not apply to common areas or to equipment serving multiple sleeping rooms.

**Section C409.4.3 is amended to read as follows:**

**C409.4.3 Energy display.** For each building subject to Section C409.2 and C409.3, either a visible display in a location with *ready access*, or a single web page or other electronic document available for access to building management or to a third-party energy data analysis service shall be provided in the building available for access to building operation and management personnel. The display shall graphically provide the current energy consumption rate for each whole building energy source, plus each end use category, as well as the total and peak maximum hourly consumption values for any day, week, month and year.

~~The display shall graphically provide the current energy consumption rate for each whole building energy source, plus each end use category, as well as the total and peak values for any day, week, month and year~~ be capable of and configured to graphically display the energy use data for any source or end use category or any combination of sources and end uses for any selected daily, weekly, monthly or annual time period, and to view the selected time period simultaneously with another selected time period or a reference benchmark time period. The display shall be capable of weather-normalizing data in the comparison time periods and facilitate display of energy use trends and identification of anomalies.

**Section C409.4.4 is amended to read as follows:**

**C409.4.4 Commissioning.** Energy metering and energy consumption management systems shall be commissioned in accordance with Section ~~C408~~ C408.6.

**Section C409.5 regarding metering for existing buildings is relocated to Section 506.1.**

**~~C409.5 Metering for existing buildings.~~**

**~~C409.5.1 Existing buildings that were constructed subject to the requirements of this section.~~** Where new or replacement systems or equipment are installed in an existing building that was constructed subject to the requirements of this section, metering shall be provided for such new or replacement systems or equipment so that their energy use is included in the corresponding end-use category defined in Section C409.3. This includes systems or equipment added in conjunction with additions or alterations to existing buildings.

**~~C409.5.1.1 Small existing buildings.~~** Metering and data acquisition systems shall be provided for additions over 25,000 square feet to buildings that were constructed subject to the requirements of this section, in accordance with the requirements of Sections C409.2 and C409.3.

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**SECTION C410  
REFRIGERATION SYSTEM REQUIREMENTS**

**Section C410.2 is amended to read as follows:**

**C410.2 Walk-in coolers, walk-in freezers, refrigerated warehouse coolers and refrigerated warehouse freezers.** *Refrigerated warehouse coolers, refrigerated warehouse freezers, and all walk-in coolers and walk-in freezers including site assembled, site constructed and prefabricated units shall comply with the following: Where they comprise any portion of the thermal envelope of the building, they shall comply with the requirements of Section C402, using the R-values or U-values listed in this Section C410.2. Section C402.1.5 component performance alternative is permitted to be used where approved by the code official.*

1. *Automatic door-closers shall be provided that fully close walk-in doors that have been closed to within 1 inch (25 mm) of full closure.*  
**Exception:** *Automatic closers are not required for doors more than 45 inches (1143 mm) in width or more than 7 feet (2134 mm) in height.*
2. *Doorways shall be provided with strip doors, curtains, spring-hinged doors or other method of minimizing infiltration when doors are open.*
3. *Walk-in coolers and refrigerated warehouse coolers shall be provided with wall, ceiling, and door insulation of not less than R-25 or have wall, ceiling and door assembly U-factors no greater than U-0.039. Walk-in freezers and refrigerated warehouse freezers shall be provided with wall, ceiling and door insulation of not less than R-32 or have wall, ceiling and door assembly U-factors no greater than U-0.030.*  
**Exception:** *Insulation is not required for glazed portions of doors or at structural members associated with the walls, ceiling or door frame.*
4. *The floor of walk-in coolers shall be provided with floor insulation of not less than R-25 or have a floor assembly U-factor no greater than U-0.040. The floor of walk-in freezers shall be provided with floor insulation of not less than R-28 or have a floor assembly U-factor no greater than U-0.035.*  
**Exception:** *Insulation is not required in the floor of a walk-in cooler that is mounted directly on a slab on grade.*
5. *Transparent fixed windows and reach-in doors for walk-in freezers and windows in walk-in freezer doors shall be provided with triple-pane glass, with the interstitial spaces filled with inert*

- gas, or be provided with heat-reflective treated glass.
6. Transparent fixed windows and reach-in doors for *walk-in coolers* and windows for *walk-in cooler* doors shall be provided with double-pane or triple-pane glass, with interstitial spaces filled with inert gas, or be provided with heat-reflective treated glass.
  7. Evaporator fan motors that are less than 1 hp (0.746 kW) and less than 460 volts shall be provided with electronically commutated motors, brushless direct-current motors, or 3-phase motors.
  8. Condenser fan motors that are less than 1 hp (0.746 kW) shall use electronically commutated motors, permanent split capacitor-type motors or 3-phase motors.
  9. Antisweat heaters that are not provided with antisweat heater controls shall have a total door rail, glass and frame heater power draw of not greater than 7.1 W/ft<sup>2</sup> (76 W/m<sup>2</sup>) of door opening for *walk-in freezers* and not greater than 3.0 W/ft<sup>2</sup> (32 W/m<sup>2</sup>) of door opening for *walk-in coolers*.
  10. Where antisweat heater controls are provided, they shall be capable of reducing the energy use of the antisweat heater as a function of the relative humidity in the air outside the door or to the condensation on the inner glass pane.
  11. Lights in *walk-in coolers*, *walk-in freezers*, *refrigerated warehouse coolers* and *refrigerated warehouse freezers* shall either be provided with light sources with an efficacy of not less than 40 lumens per watt, including ballast losses, or shall be provided with a device that turns off the lights within 15 minutes of when the *walk-in cooler* or *walk-in freezer* space is not occupied.
  12. Evaporator fans in refrigerated warehouses shall be variable speed, and the speed shall be controlled in response to space conditions.  
**EXCEPTION:** Evaporators served by a single compressor without unloading capability.

**Section C410.3 is amended to read as follows:**

**C410.3 Refrigeration systems.** Refrigerated display cases, *walk-in coolers* or *walk-in freezers* that are served by remote compressors and remote condensers not located in a *condensing unit*, shall comply with Sections C410.3.1, C410.3.2, and C403.9.2.3.

**Exception:** Systems where the working fluid in the refrigeration cycle goes through both subcritical and supercritical states (transcritical) or that use ammonia refrigerant are exempt.

**Section C410.3.2 is amended to read as follows:**

**C410.3.2 Compressor systems.** Refrigeration compressor systems shall comply with the following:

1. Compressors and multiple-compressor system suction groups shall include control systems that use floating suction pressure control logic to reset the target suction pressure temperature based on the temperature requirements of the attached refrigeration display cases or walk-ins.

**Exception:** Controls are not required for the following:

1. Single-compressor systems that do not have variable capacity capability.
  2. Suction groups that have a design saturated suction temperature of 30°F (-1.1°C) or higher, suction groups that comprise the high stage of a two-stage or cascade system, or suction groups that primarily serve chillers for secondary cooling fluids.
2. Liquid subcooling shall be provided for all low-temperature compressor systems with a design cooling capacity equal to or greater than 100,000 Btu/hr (29.3 kW) with a design-saturated suction temperature of -10°F (-23°C) or lower. The subcooled liquid temperature shall be controlled at a maximum temperature set point of 50°F (10°C) at the exit of the subcooler using either compressor economizer (interstage) ports or a separate compressor suction group operating at a saturated suction temperature of 18°F (-7.8°C) or higher.

- 2.1. Insulation for liquid lines with a fluid operating temperature less than 60°F (15.6°C) shall comply with ~~Table C403.2.10~~ C403.10.3.
3. Compressors that incorporate internal or external crankcase heaters shall provide a means to cycle the heaters off during compressor operation.
4. Compressor systems utilized in refrigerated warehouses shall conform to the following:
  - 4.1. Compressors shall be designed to operate at a minimum condensing temperature of 70°F or less.
  - 4.2. The compressor speed of a screw compressor greater than 50 hp shall be controllable in response to the refrigeration load or the input power to the compressor shall be controlled to use no more than 60 percent of full load input power when operated at 50 percent of full refrigeration capacity.

**EXCEPTION.** Refrigeration plants with more than one dedicated compressor per suction group.

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## **SECTION C411 SOLAR READINESS**

### **Section C411.1 is amended to read as follows:**

**C411.1 General.** A In addition to the requirements of Section C412, a solar zone shall be provided on non-residential buildings that are 20 stories or less in height above grade plane. The solar zone shall be located on the roof of the building or on another structure elsewhere on the site. The solar zone shall be in accordance with Sections C411.2 through C411.8 and the *International Fire Code*.

**Exception.** A solar zone is not required where the solar exposure of the building's roof area is less than 75 percent of that of an unshaded area, as defined in Section C411.5, in the same location, as measured by one of the following:

1. Incident solar radiation expressed in kWh/ft<sup>2</sup>-yr using typical meteorological year (TMY) data;
2. Annual sunlight exposure expressed in cumulative hours per year using TMY data;
3. Shadow studies indicating that the roof area is more than 25 percent in shadow, on September 21 at 10am, 11am, 12pm, 1pm, and 2pm solar time.

### **Section C411.2 is amended to read as follows:**

**C411.2 Minimum area.** The minimum area of the solar zone shall be determined by one of the following methods, whichever results in the smaller area:

1. 40 percent of roof area. The roof area shall be calculated as the horizontally-projected gross roof area less the area covered by skylights, occupied roof decks, mechanical equipment, and planted areas.
2. 20 percent of electrical service size. The electrical service size is the rated capacity of the total of all electrical services to the building, and the required solar zone size shall be based upon 10 peak watts of photovoltaic per square foot.

**Exception.** Subject to the approval of the *code official*, buildings with extensive rooftop equipment that would make full compliance with this section impractical shall be permitted to reduce the size of the *solar zone* required by Section C411.2 to the maximum practicable area.



**Example:** A building with a 10,000 SF total roof area, 1,000 SF skylight area, and a 400 Amp, 240 volt single phase electrical service is required to provide a solar zone area of the smaller of the following:

1.  $[40\% \times (10,000 \text{ SF roof area} - 1,000 \text{ SF skylights})] = 3,600 \text{ SF}$ ; or

2.  $[400 \text{ Amp} \times 240 \text{ Volts} \times 20\% / 10 \text{ watts per SF}] = 1,920 \text{ SF}$

Therefore, a solar zone of 1,920 square feet is required.

**Section C411.4 is amended to read as follows:**

**C411.4 Obstructions.** The solar zone shall be free of pipes, vents, ducts, HVAC equipment, skylights and other obstructions, except those serving photovoltaic systems within the solar zone. The solar zone is permitted to be located above any such obstructions, provided that the racking for support of the future system is installed at the time of construction, the elevated solar zone does not shade other portions of the solar zone, and its height is permitted by the *International Building Code* and the *Shoreline Municipal Code Title 20*. Photovoltaic or solar water heating systems are permitted to be installed within the solar zone.

**Section C411.8 is amended to read as follows:**

**C411.8 Photovoltaic interconnection.** A minimum 2-inch diameter roof penetration conduit shall be provided, with threaded caps above and below the roof deck and minimum R-10 insulation wrapping the lower portion, within each 2,500 square foot section of the required solar zone area. Interconnection of the future photovoltaic system shall be provided for at the main service panel, either ahead of the service disconnecting means or at the end of the bus opposite the service disconnecting means, in one of the following forms:

1. A space for the mounting of a future overcurrent device, sized to accommodate the largest standard rated overcurrent device that is less than 20 percent of the bus rating.
2. Lugs sized to accommodate conductors with an ampacity of at least 20 percent of the bus rating, to enable the mounting of an external overcurrent device for interconnection.

The electrical construction documents shall indicate the following:

1. Solar zone boundaries and access pathways;
2. Location for future inverters and metering equipment; and
3. Route for future wiring between the photovoltaic panels and the inverter, and between the inverter and the main service panel.

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**A new Section, Section C412 Renewable Energy is added and shall read as follows:**

**SECTION C412**  
**RENEWABLE ENERGY**

**C412.1 On-site renewable energy systems.** Each new building or addition larger than 5,000 square feet of gross conditioned floor area shall include a renewable energy generation system consisting of not less than 0.25 watts rated peak photovoltaic energy production per square foot of conditioned space.

**Exceptions:**

1. Increased additional energy credits. ~~where~~ 3.0 additional energy credits from Table C406.1

are provided in addition to those required by other sections of this code, the on-site renewable energy generation system is not required.

1.1. Where 1.0 additional energy credits from Table C406.1 is provided in addition to those required by other sections of this code, the size of the on-site renewable energy generation system is permitted to be reduced by 1/3.

1.2. Where 2.0 additional energy credits from Table C406.1 are provided in addition to those required by other sections of this code, the size of the on-site renewable energy generation system is permitted to be reduced by 2/3.

1.3 Where approved by the City, interpolation between exceptions 1, 1.1, and 1.2 is permitted.

2. Reduced Building Performance Factor. For projects utilizing the Section C407 Total Building Performance compliance path, the on-site renewable energy generation system is not required where the building performance factor (BPF) is not less than 3 percent lower than the maximum BPF permitted cumulatively by all other sections of this code.

**Example:** To use this exception, a building with a required BPF of 50 would be required to provide a BPF of  $(50 \times 0.97 =) 48.5$  instead.

2.1 Where the BPF is not less than 1 percent lower than the BPF required cumulatively by other sections of this code, the size of the on-site renewable energy generation system is permitted to be reduced by 1/3.

2.2 Where the BPF is not less than 2 percent lower than the BPF required cumulatively by other sections of this code, the size of the on-site renewable energy generation system is permitted to be reduced by 2/3.

3. Transfer to an *affordable housing* project. Where *approved* by the City, all or part of the required on-site renewable energy generation system is permitted to be replaced by construction of a system that is 50 percent of the required system size when located on an existing *affordable housing* project within the City, or 75 percent of the required system size when located on a new construction *affordable housing* project within the City. Documentation demonstrating that the renewable energy generation system has been installed on the *affordable housing* project site, the system is fully operational, and ownership has been transferred to the owner of the *affordable housing* project, must be submitted prior to issuance of the certificate of occupancy.

**City Informative Note:** Option 3 will only be available if an affordable housing project is available to accept the renewable energy system. There is no assurance that such a project location will be available. It is the owner's responsibility to locate and coordinate with the affordable housing project, and to ensure that the installation is completed in a timely manner.

4. Transfer to a Washington state agency program. Where *approved* by the City, all or part of the required renewable energy generation system is permitted to be replaced by a contribution of \$2.50 for each required watt of installed capacity, to a solar energy fund managed by a Washington state agency that will provide solar energy installations for *affordable housing* projects. Documentation demonstrating that the contribution has been received by the state agency must be submitted prior to issuance of the certificate of occupancy.

**City Informative Note:** Option 4 will only be available if a solar energy fund for affordable housing is created by the Housing Trust Fund, Washington State Housing Finance Commission, or another state agency program for which the project is qualified to participate. There is no assurance that such a program will be available.

5. *Affordable housing*. The on-site renewable energy generation system is not required for

affordable housing projects.

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## **AMENDMENTS TO CHAPTER 5 EXISTING BUILDINGS**

### **SECTION C502 ADDITIONS**

#### **Section C502.1 is amended to read as follows:**

**C502.1 General.** *Additions* to an existing building, building system or portion thereof shall conform to the provisions of this code as they relate to new construction without requiring the unaltered portion of the existing building or building system to comply with this code. Additions shall not create an unsafe or hazardous condition or overload existing building systems. An addition shall be deemed to comply with this code if the addition alone complies or if the existing building and addition comply with this code as a single building. Additions using the prescriptive path in Section C401.2, item 1, shall also comply with Sections C402, C403, C404, C405, C406, C409.5, C410 and C502.2.

#### **A new section, Section C502.1.1, is added and shall read as follows:**

**C502.1.1 Additional efficiency package options.** *Additions* shall comply with Section C406, either for the *addition* only or for the total of the existing building plus *addition*.

**Exception:** *Additions* smaller than 500 square feet of *conditioned floor area* are not required to comply with Section C406.

#### **Section C502.2.2 is amended to read as follows:**

**C502.2.2 Skylight area.** *Additions* with *skylights* that result in a total building skylight area less than or equal to that specified in Section C402.4.1 shall comply with Section C402.4. *Additions* with skylights that result in a total building skylight area greater than that specified in Section C402.4.1 shall comply with one of the following:

- ~~1. Vertical fenestration alternate per Section C402.4.1.1 or C402.4.1.3 for the addition area of the building only~~
2. 1. Component performance alternative with the target area adjustment per Section C402.1.5 for the addition area of the building only.
3. 2. Existing building and addition area combined to demonstrate compliance with the component performance alternative for the whole building.
4. 3. Total building performance in accordance with Section C407 for the addition area of the building only.
5. 4. Total building performance for the whole building.

#### **Section 502.2.6.2 shall be amended to read as follows:**

**C502.2.6.2 Exterior lighting power.** The total exterior lighting power for the addition shall comply with Section C405.5.4 ~~2~~ for the addition ~~and the existing building and the addition shall comply~~ or, 105

as a single building.

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## SECTION C503 ALTERATIONS

### **Section C503.1 shall be amended to read as follows:**

**C503.1 General.** Alterations to any building or structure shall comply with the requirements of Section C503 and the code for new construction. Alterations to an existing building, building system or portion thereof shall conform to the provisions of this code as they relate to new construction without requiring the unaltered portions of the existing building or building system to comply with this code. Alterations shall be such that the existing building or structure is no less conforming to the provisions of this code than the existing building or structure was prior to the alteration.

#### **Exceptions:**

1. The following alterations need not comply with the requirements for new construction provided the energy use of the building is not increased:

- 4- a. Storm windows installed over existing fenestration.
- 2- b. Surface applied window film installed on existing single pane fenestration assemblies to reduce solar heat gain provided the code does not require the glazing fenestration to be replaced.
- 3- c. Existing ceiling, wall or floor cavities exposed during construction provided that these cavities are insulated to full depth with insulation having a minimum nominal value of R-3.0 per inch installed per Section C402.
- 4- d. Construction where the existing roof, wall or floor cavity is not exposed.
- 5- e. *Roof recover.*
- 6- f. *Air barriers* shall not be required for roof recover and roof replacement where the alterations or renovations to the building do not include alterations, renovations or repairs to the remainder of the building envelope.
- 7- g. Replacement of existing doors that separate conditioned space from the exterior shall not require the installation of a vestibule or revolving door, provided however that an existing vestibule that separates a conditioned space from the exterior shall not be removed.

2. *Alterations* are not required to comply with Section C406 except where specifically noted in Sections C503.2 and C505.1.

### **Section C503.2 is amended to read as follows:**

**C503.2 Change in space conditioning.** Any low energy space in accordance with Section C402.1.1.1 that is altered to become *conditioned space* or *semi-heated* space shall be brought into full compliance with this code. Any *semi-heated* space in accordance with Section C402.1.1.2 that is altered to become *conditioned space*, or any heated but not cooled space that is altered to become both heated and cooled, shall be brought into full compliance with this code. Compliance shall include the provisions of Section C406, applied only to the portion of the building undergoing a change in space conditioning.

For buildings with more than one space conditioning category, the interior partition walls, ceilings, floors and fenestration that separate space conditioning areas shall comply with the thermal envelope requirements per the area with the highest level of space conditioning.

A change in space conditioning project shall be deemed to comply with this code if the project area alone complies or if the existing building and the project area combined comply with this code as a

whole building.

**Exception:** Buildings or spaces that were permitted prior to the 2009 WSEC, or were originally permitted as unconditioned, may comply with this section as follows:

1. Where the component performance alternative in Section C402.1.5 is used to demonstrate compliance with this section, the Proposed Total UA is allowed to be up to 110 percent of the Allowable Total UA. This exception may be applied to the project area alone, or to the existing building and project area combined as a whole building.
2. Where total building performance in Section C407 is used to demonstrate compliance with this section, the total annual carbon emissions from energy consumption of the proposed design is allowed to be up to 110 percent of the annual carbon emissions from energy consumption allowed by Section C407.3. This exception may be applied to the project area alone, or to the existing building and project area combined as a whole building.
3. The addition of cooling equipment serving rooms or spaces totaling less than 2000 square feet in floor area does not trigger the requirement to comply with this section.

**Section C503.3 is amended to read as follows:**

**C503.3 Building envelope.** New building envelope assemblies that are part of the alteration shall comply with Sections C402.1 through C402.5 as applicable. Where an opaque envelope assembly is altered or replaced, the new assembly shall in no case have a higher overall U-value than the existing.

**Exception:** Air leakage testing is not required for alterations and repairs, unless the project includes a change in space conditioning according to Section C503.2 or a change of occupancy or use according to Section C505.1.

**Section C503.3.1 is amended to read as follows:**

**C503.3.1 Roof replacement.** *Roof replacements* shall comply with Table C402.1.3 or C402.1.4 where the existing roof assembly is part of the *building thermal envelope* and contains no insulation or contains insulation entirely above the roof deck.

**Section C503.3.2 is amended to read as follows:**

**C503.3.2 Vertical fenestration.** The addition of *vertical fenestration* that results in a total building vertical fenestration area less than or equal to that specified in Section C402.4.1 shall comply with Section C402.4. Alterations that result in a total building vertical fenestration area greater than specified in Section C402.4.1 shall comply with one of the following:

1. Vertical fenestration alternate in accordance with Section C402.4.1.3 for the new vertical fenestration added, where the calculation of vertical fenestration area and gross above-grade wall area shall include either the entire building or, where approved, only those areas in the addition of the building involved in the alteration.
2. ~~Reserved Vertical fenestration alternate in accordance with Section C402.4.1.1 for the area adjacent to the new vertical fenestration added.~~
3. Existing building and ~~alteration~~ alteration area are combined to demonstrate compliance with the component performance ~~alternative~~ alternative with target area adjustment in accordance with

Section C402.1.5 for the whole building. The Proposed Total UA is allowed to be up to 110 percent of the Allowed Total UA.

4. Total building performance in accordance with Section C407 for the whole building. The total annual carbon emissions from energy consumption of the proposed design is allowed to be up to 110 percent of the annual carbon emissions from energy consumption allowed in accordance with Section C407.3.

**Exception:** ~~Additional~~ Where approved by the code official, additional fenestration is permitted where sufficient envelope upgrades beyond those required by other sections of this code are included in the project so that the addition of vertical fenestration does not cause a reduction in overall building energy efficiency, as approved by the code official an increase in the overall energy use of the building.

### **Section C503.3.2.1 is amended to read as follows:**

**C503.3.2.1 Application to replacement fenestration products.** Where some or all of an existing *fenestration* unit is replaced with a new *fenestration* product, including sash and glazing, the replacement *fenestration* unit shall meet the applicable requirements for *U*-factor and *SHGC* in Table C402.4. In addition, the area-weighted U-value of the new fenestration shall be equal to or lower than the U-value of the existing fenestration.

**Exception:** An area-weighted average of the *U*-factor of replacement fenestration products being installed in the building for each fenestration product category listed in Table C402.4 shall be permitted to satisfy the *U*-factor requirements for each fenestration product category listed in Table C402.4. Individual fenestration products from different product categories listed in Table C402.4 shall not be combined in calculating the area-weighted average *U*-factor.

### **Section C503.4 is amended to read as follows:**

**C503.4 Mechanical systems.** Those parts of systems which are altered or replaced shall comply with Section C403. Additions or alterations shall not be made to an existing mechanical system that will cause the existing mechanical system to become out of compliance.

#### **Exceptions:**

1. Existing mechanical systems which are altered or where parts of the system are replaced are not required to be modified to comply with Section C403.3.5 as long as mechanical cooling capacity is not added to a system that did not have cooling capacity prior to the alteration.
2. Alternate mechanical system designs that are not in full compliance with this code may be approved when the *code official* determines that existing building constraints including, but not limited to, available mechanical space, limitations of the existing structure, or proximity to adjacent air intakes or exhausts make full compliance impractical. Alternate designs shall include additional energy saving strategies not prescriptively required by this code for the scope of the project including, but not limited to, demand control ventilation, energy recovery, or increased mechanical cooling or heating equipment efficiency above that required by Tables C403.3.2(1) through C403.3.2(13).
3. Only those components of existing HVAC systems that are altered or replaced shall be required to meet the requirements of Section C403.8.1, Allowable fan motor horsepower. Components replaced or altered shall not exceed the fan power limitation pressure drop adjustment values in Table C403.8.1(2) design conditions. Section C403.8.1 does not

require the removal and replacement of existing system ductwork.

**Section C503.4.2 shall be amended to read as follows:**

**C503.4.2 Addition of cooling capacity.** Where mechanical cooling is added to a space that was not previously cooled, the mechanical system shall comply with either Section C403.3.5 or C403.5.

**Exceptions:**

1. Qualifying small equipment: Economizers are not required for cooling units and split systems serving one zone with a total cooling capacity rated in accordance with Section C403.3.2 of less than 33,000 Btu/h (hereafter referred to as qualifying small systems) provided that these are high-efficiency cooling equipment with SEER and EER values more than 15 percent higher than minimum efficiencies listed in Tables C403.3.2 (1) through (3), in the appropriate size category, using the same test procedures. Equipment shall be listed in the appropriate certification program to qualify for this exception. The total capacity of all qualifying small equipment without economizers shall not exceed 72,000 Btu/h per building, or 5 percent of the building total air economizer capacity, whichever is greater.

Notes and exclusions for Exception 1:

- 1.1. The portion of the equipment serving Group R occupancies is not included in determining the total capacity of all units without economizers in a building.
  - 1.2. Redundant units are not counted in the capacity limitations.
  - 1.3. This exception shall not be used for the initial tenant improvement of a shell-and-core building or space, or for total building performance in accordance with Section C407
  - 1.4. This exception shall not be used for unitary cooling equipment installed outdoors or in a mechanical room adjacent to the outdoors
2. Chilled water terminal units connected to systems with chilled water generation equipment with IPLV values more than 25 percent higher than minimum part load equipment efficiencies listed in Table C403.3.2(7), in the appropriate size category, using the same test procedures. Equipment shall be listed in the appropriate certification program to qualify for this exception. The total capacity of all systems without economizers shall not exceed ~~480,000~~ 72,000 Btu/h (141 kW) per building, or 20 percent of the building total air economizer capacity, whichever is greater.

Notes and exclusions for Exception 4 2:

- 2.1. The portion of the equipment serving Group R occupancy is not included in determining the total capacity of all units without economizers in a building.
- 2.2. This exception shall not be used for the initial tenant improvement of a shell-and-core building or space, or for total building performance in accordance with Section C407.

**Section C503.4.3 is amended to read as follows:**

**C503.4.3 Alterations or replacement of existing cooling systems.** Alterations to, or replacement of, existing mechanical cooling systems shall not decrease the building total economizer capacity unless the system complies with either Section C403.3.5 or C403.5. System alterations or replacement shall comply with Table C503.4 when either the individual cooling unit capacity ~~and~~ or the building total capacity of all cooling equipment without economizer ~~do~~ does not comply with Sections C403.3.5 or C403.5.



**Table C503.4 is amended to read as follows:**

**TABLE C503.4  
 ECONOMIZER COMPLIANCE OPTIONS FOR MECHANICAL ALTERATIONS**

Unit Type	Option A	Option B (alternate to A)	Option C (alternate to A)	Option D (alternate to A)
	Any <i>alteration</i> with new or replacement equipment	Replacement unit of the same type with the same or smaller output capacity	Replacement unit of the same type with a larger output capacity	New equipment added to existing system or replacement unit of a different type
1. Packaged Units	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>	Efficiency: min. <sup>a</sup> Economizer: CC403.5 <sup>b</sup>	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>
2. Split Systems	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>	For units ≤ 60,000 Btuh, comply with two of two measures: 1. Efficiency: + 10% <sup>e</sup> 2. Economizer: shall not decrease existing economizer capability  For all other capacities: Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>	For units ≤ 60,000 Btuh replacing unit installed prior to 1991, comply with at least one of two measures: 1. Efficiency: + 10% <sup>e</sup> 2. Economizer: 50% <sup>f</sup>  For all other capacities: Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>
3. Water Source Heat Pump	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>	For units ≤72,000 Btuh, comply with at least two of three measures: 1. Efficiency: + 10% <sup>e</sup> 2. Flow control valve <sup>g</sup> 3. Economizer: 50% <sup>f</sup>  For all other capacities: Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>	For units ≤72,000 Btuh, comply with at least two of three measures: 1. Efficiency: + 10% <sup>e</sup> 2. Flow control valve <sup>g</sup> 3. Economizer: 50% <sup>f</sup> (except for certain pre-1991 systems <sup>h</sup> )  For all other capacities: Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup> (except for certain pre-1991 systems <sup>g</sup> )
4. <i>Water Economizer</i> using Air-Cooled Heat Rejection Equipment (Dry Cooler)	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>	Efficiency: +5% <sup>d</sup> Economizer: shall not decrease existing economizer capacity	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>
5. Air-Handling Unit (including fan coil units) where the system has an air-cooled chiller	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>	Economizer: shall not decrease existing economizer capacity	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup> (except for certain pre-1991 systems <sup>g</sup> )	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup> (except for certain pre-1991 systems <sup>g</sup> )
6. Air- Handling Unit (including fan coil units) and Water-cooled Process Equipment,	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>	Economizer: shall not decrease existing economizer capacity	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup> (except for certain pre-1991 systems <sup>h</sup> and certain 1991-2016 systems <sup>i</sup> .)	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup> (except for certain pre-1991 systems <sup>h</sup> and certain 1991-2016 systems <sup>i</sup> )

Unit Type	Option A	Option B (alternate to A)	Option C (alternate to A)	Option D (alternate to A)
	Any <i>alteration</i> with new or replacement equipment	Replacement unit of the same type with the same or smaller output capacity	Replacement unit of the same type with a larger output capacity	New equipment added to existing system or replacement unit of a different type
where the system has a water-cooled chiller <sup>d</sup>				

**TABLE C503.4 (Continued)**  
**ECONOMIZER COMPLIANCE OPTIONS FOR MECHANICAL ALTERATIONS**

Unit Type	Option A	Option B (alternate to A)	Option C (alternate to A)	Option D (alternate to A)
	Any <i>alteration</i> with new or replacement equipment	Replacement unit of the same type with the same or smaller output capacity	Replacement unit of the same type with a larger output capacity	New equipment added to existing system or replacement unit of a different type
7. Cooling Tower	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>	No requirements	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>
8. Air-Cooled Chiller	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>	Efficiency: + 10% <sup>k</sup> Economizer: shall not decrease existing economizer capacity	Efficiency: Comply with two of two measures: 1. + 10% <sup>k,l</sup> 2. Multistage Economizer: shall not decrease existing economizer capacity	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>
9. Water-Cooled Chiller	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>	Efficiency: Comply with at least one of two measures: 1. Part load IPLV + 15% <sup>n</sup> 2. Plate frame heat exchanger <sup>o</sup> Economizer: shall not decrease existing economizer capacity	Efficiency: Comply with two of two measures: 1. Part load IPLV + 15% <sup>n</sup> 2. Plate frame heat exchanger <sup>o</sup> Economizer: shall not decrease existing economizer capacity	Efficiency: min. <sup>a</sup> Economizer: C403.5 <sup>b</sup>

- a. Minimum equipment efficiency shall comply with Section C403.3.2 and Tables C403.3.2(1) through C403.3.2(42-13).
- b. All separate new equipment and replacement equipment shall have air economizer complying with Section C403.5 including both the individual unit size limits and the total building capacity limits on units without economizer. It is acceptable to comply using one of the exceptions to Section C403.5.
- c. **Reserved.**
- d. Equipment shall have a capacity-weighted average cooling system efficiency that is 5 percent better than the requirements in Tables C403.3.2(1) and C403.3.2(2) (1.05 x values in Tables C403.3.2(1) and C403.3.2(2)).
- e. Equipment shall have a capacity-weighted average cooling system efficiency that is 10 percent better than the requirements in Tables C403.3.2(1)A and C403.3.2(2) (1.10 x values in Tables C403.3.2(1)A and C403.3.2(2)).
- f. Minimum of 50 percent air economizer that is ducted in a fully enclosed path directly to every heat pump unit in each zone, except that ducts may terminate within 12 inches of the intake to an HVAC unit provided that they are physically fastened so that the outside air duct is directed into the unit intake. If this is an increase in the amount of outside air supplied to this unit, the outside air supply system shall be configured to provide this additional outside air and be equipped with economizer control.
- g. Water-source heat pump systems shall have a flow control valve to eliminate flow through the heat pumps that are not in operation and variable speed pumping control complying with Section C403.4.3 for that heat pump.
  - When the total capacity of all units with flow control valves exceeds 15 percent of the total system capacity, a variable frequency drive shall be installed on the main loop pump.
  - As an alternate to this requirement, the capacity-weighted average cooling system efficiency shall be 5 percent

- better than the requirements in footnote e for water-source heat pumps (i.e. a minimum of 15 percent better than the requirements in Table C403.3.2(2) (1.15 x values in Table C403.3.2(2)).
- h. Water economizer equipment shall have a capacity-weighted average cooling system efficiency that is 10 percent better than the requirements in Tables C403.3.2(8) and C403.3.2(9) (1.10 x values in Tables C403.3.2(8) and C403.3.2(9)).
  - i. Air economizer is not required for systems installed with water economizer plate and frame heat exchanger complying with previous codes between 1991 and June 2016, provided that the total fan coil load does not exceed the existing or added capacity of the heat exchangers.
  - j. For water-cooled process equipment where the manufacturers specifications require colder temperatures than available with water-side economizer, that portion of the load is exempt from the economizer requirements.
  - k. The air-cooled chiller shall have an IPLV efficiency that is a minimum of 10 percent greater than the IPLV requirements in EER in Table C403.3.2(7) (1.10 x IPLV values in EER in Table C403.3.2(7)).
  - l. The air-cooled chiller shall be multistage with a minimum of two compressors.
  - m. ~~Reserved. The water-cooled chiller shall have full load and part load IPLV efficiency that is a minimum of 5 percent greater than the IPLV requirements in Table C403.3.2(7) (1.05 x IPLV values in Table C403.3.2(7)).~~
  - n. The water-cooled chiller shall have an IPLV value that is a minimum of 15 percent lower than the IPLV requirements in Table C403.3.2(7), (~~4.45~~ 0.85 x IPLV values in Table C403.3.2(7)). Water-cooled centrifugal chillers designed for non-standard conditions shall have an NPLV value that is at least 15 percent lower than the adjusted maximum NPLV rating in kW per ton defined in Section C403.3.2.1 (~~4.45~~ 0.85 x NPLV).
  - o. Economizer cooling shall be provided by adding a plate-frame heat exchanger on the water-side with a capacity that is a minimum of 20% of the chiller capacity at standard AHRI rating conditions.
  - p. **Reserved.**
  - q. Systems installed prior to 1991 without fully utilized capacity are allowed to comply with Option B, provided that the individual unit cooling capacity does not exceed 90,000 Btuh.

**Section C503.5 is amended to read as follows:**

**C503.5 Service hot water systems.** New service hot water systems that are part of the alteration shall comply with Section C404.

**Exception.** Where only one service hot water appliance is failing and is replaced by another having the same or lesser heating capacity and the same or higher efficiency, no other alterations are made to the central service hot water system, and this exception has not been used within the same building in the previous 24-month period, this provision does not apply.

**Section C503.6 is amended to read as follows:**

**C503.6 Lighting, ~~controlled~~ receptacles and motors.** Alterations or the addition of lighting, ~~controlled~~ receptacles and motors shall comply with Sections C503.6.1 through C503.6.6.

**Section C503.6.1 is amended to read as follows:**

**C503.6.1 Luminaire additions and alterations.** Alterations that add, alter, or replace ~~50~~ 20 percent or more of the luminaires or of the lamps plus ballasts alone in a space enclosed by walls or ceiling-height partitions, replace ~~50~~ 20 percent or more of parking garage luminaires, or replace ~~50~~ 20 percent or more of the total installed wattage of exterior luminaires shall comply with Sections C405.4 and C405.5. Where less than ~~50~~ 20 percent of the fixtures in an interior space enclosed by walls or ceiling-height partitions or in a parking garage are added or replaced, or less than ~~50~~ 20 percent of the installed exterior wattage is replaced, the installed lighting wattage shall be maintained or reduced.

**Section C503.6.3 is amended to read as follows:**

**C503.6.3 New or moved lighting panel.** Where a new lighting panel (or a moved lighting panel) with all new raceway and conductor wiring from the panel to the fixtures is being installed, controls shall also comply with, in addition to the requirements of Section C503.6.2, all remaining requirements in Sections C405.2 and C408.3.

**Section C503.6.5 is amended to read as follows:**

**C503.6.5 Motors.** Those motors which are altered or replaced shall comply with Section C405.8. In no case shall the energy efficiency of the building be decreased.

**Section C503.6.6 is amended to read as follows:**

**C503.6.6 Controlled receptacles.** Where electric receptacles are added or replaced, controlled receptacles shall be provided in accordance with Section C405.10.

**Exceptions:**

1. Where an alteration project impacts an area smaller than 5,000 square feet, controlled receptacles are not required.
2. Where existing systems furniture or partial-height relocatable office cubicle partitions are reconfigured or relocated within the same area, controlled receptacles are not required in the existing systems furniture or office cubicle partitions.
3. Where new or altered receptacles meet the exception 1 to Section C405.10, they are not required to be controlled receptacles or be located within 12 inches of non-controlled receptacles.

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**SECTION C504  
REPAIRS**

**Section C504.2 is amended to read as follows:**

**C504.2 Application.** For the purposes of this code, the following shall be considered repairs.

1. Glass only replacements in an existing sash and frame.
2. *Roof repairs.*
3. ~~Air barriers shall not be required for roof repair where the repairs to the building do not include alterations, renovations or repairs to the remainder of the building envelope.~~
4. ~~Replacement of existing doors that separate conditioned space from the exterior shall not require the installation of a vestibule or revolving door, provided however that an existing vestibule that separates a conditioned space from the exterior shall not be removed.~~
5. ~~Repairs where only the bulb and/or ballast within the existing luminaires in a space are replaced provided that the replacement does not increase the installed interior lighting power.~~

**City Informative Note:** Exceptions 3 and 4 appear in the exceptions to Section C503.1.  
For Exception 5, see Section C503.6.1.

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**SECTION C505  
CHANGE OF OCCUPANCY OR USE**

**Section C505.1 is amended to read as follows:**

**C505.1 General.** Spaces undergoing a change in occupancy shall be brought up to full compliance with this code in the following cases:

1. Any space that is converted from an F, S or U occupancy to an occupancy other than F, S or U.
2. Any space that is converted to a Group R dwelling unit or portion thereof, from another use or occupancy.
3. Any Group R dwelling unit or portion thereof permitted prior to July 1, 2002, that is converted to a commercial use or occupancy.

**Exception:** Buildings or spaces that were permitted prior to the 2009 WSEC, or were originally permitted as unconditioned, may comply with this section as follows:

1. Where the component performance alternative in Section C402.1.5 is used to demonstrate compliance with this section, the Proposed Total UA is allowed to be up to 110 percent of the Allowable Total UA. This exception may be applied to the project area alone, or to the existing building and project area combined as a whole building.
2. Where total building performance in Section C407 is used to demonstrate compliance with this section, the total annual carbon emissions from energy consumption of the proposed design is allowed to be 110 percent of the annual carbon emissions from energy consumption allowed by Section C407.3. This exception may be applied to the project area alone, or to the existing building and project area combined as a whole building.
3. Where the building or space is altered to become a bakery, commercial kitchen or commercial laundry, and the proposed design uses only all-electric Energy Star-rated process equipment and code compliant all-electric HVAC equipment, improvements to the building envelope immediately adjoining the spaces containing that use shall not be required. For the purposes of this exception, no fossil fuel burning equipment of any kind may be installed within the building or space undergoing the *change of occupancy*.

Compliance shall include the provisions of Section C406, applied only to the portion of the building undergoing a *change of occupancy* or use. Where the use in a space changes from one use in Table C405.4.2(1) or (2) to another use in Table C405.4.2(1) or (2), the installed lighting wattage shall comply with Section C405.4.

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**A NEW SECTION, Section C506 is added and shall read as follows:**

**SECTION C506  
METERING FOR EXISTING BUILDINGS**

**City Informative Note:** Section C506.1 was relocated from Section C409.5.

**C506.1 Existing buildings that were constructed subject to the requirements of this section.**  
Where new or replacement systems or equipment are installed in an existing building that was constructed subject to the requirements of this section, metering shall be provided for such new or replacement systems or equipment so that their energy use is included in the corresponding end-use

category defined in Section C409.3. This includes systems or equipment added in conjunction with additions or alterations to existing buildings.

**C506.1.1 Small existing buildings.** In buildings that were constructed subject to Section C409, metering and *data acquisition systems* shall be provided for *additions* over 10,000 square feet in accordance with the requirements of sections C409.2, C409.3 and C409.4.

**C506.2 Metering for the addition or replacement of HVAC equipment in existing buildings.** Where HVAC equipment is added or replaced, metering shall be provided according to Sections C506.2.1 or C506.2.2, as applicable.

**C506.2.1 Addition or replacement of individual HVAC equipment pieces.** Where HVAC equipment is added or replaced, but compliance with Section C506.2.2 is not required, metering shall be provided as follows, and the data from these meters is permitted to either be stored locally using a manual totalizing meter or other means at the meter or fed into a central data collection system.

1. Electrical metering shall be provided for all of the following:
  - a. Each new or existing branch circuit serving a new piece of HVAC equipment with minimum circuit ampacity (MCA) that equates to 50 kVA or more. A single meter is permitted to serve multiple circuits of the same submetering category from Section C409.3.
  - b. Each new or existing branch circuit supplied by a new electrical panel that is dedicated to serving HVAC equipment. It shall be permitted to meter the circuits individually or in aggregate.
  - c. Each new HVAC fan or pump on a variable speed drive, where the fan, pump, or variable speed drive are new, unless the variable speed drive is integral to a packaged HVAC unit or the existing variable speed drive does not have the capability to provide electric metering output.
2. Natural gas metering shall be provided for each new natural gas connection that is rated at 1,000 kBTU or higher. A single meter is permitted to serve multiple equipment pieces of the same sub-metering category from Section C409.3; HVAC, water heating or process.

**C506.2.2 Addition or replacement of the majority of HVAC equipment in a building.** Where permits are issued for new or replacement HVAC equipment that has a total heating and cooling capacity greater than 1,200 kBTU/hour and greater than 50 percent of the building's existing HVAC heating and cooling capacity, within any 12-month period, the following shall be provided for the building:

1. Energy source metering required by Section C409.2.
2. HVAC system end-use metering required by Section C409.3.1
3. Data acquisition and display system per the requirements of Section C409.4.

Each of the building's existing HVAC chillers, boilers, cooling towers, air handlers, packaged units and heat pumps that has a capacity larger than 5 tons or that represents more than 10 percent of the total heating and cooling capacity of the building shall be included in the calculation of the existing heating and cooling capacity of the building. Where heat pumps are configured to deliver both heating and cooling, the heating and cooling capacities shall both be included in the calculation of the total capacity.

Each of the building’s existing and new HVAC chillers, boilers, cooling towers, air handlers, packaged units and heat pumps that has a heating or cooling capacity larger than 5 tons or that represents more than 10 percent of the total heating and cooling capacity of the building shall be included in the HVAC system end-use metering.

Construction documents for new or replacement heating and cooling equipment projects shall indicate the total heating and cooling capacity of the building’s existing HVAC equipment and the total heating and cooling capacity of the new or replacement equipment. Where permits have been issued for new or replacement heating and cooling equipment within the 12-month period prior to the permit application date, the heating and cooling capacity of that equipment shall also be indicated. For the purpose of this tabulation, heating and cooling capacities of all equipment shall be expressed in kBTU / hour.

**C506.3 Tenant space electrical sub-metering for existing buildings.** For tenant improvements in which a single tenant will occupy a full floor or multiple floors of a building, the electrical consumption for the tenant space on that floor shall be separately metered, and the metering data provided to the tenant with a display system per the requirements of Section C409.4.3. For the purposes of this section, separate end use categories need not be segregated.

**EXCEPTION:** Where an existing branch circuit electrical panel serves tenant spaces on multiple full floors of a building, the floors served by that panel are not required to comply with this section.

**C506.4 Metering for complete electrical system replacement.** If all, or substantially all, of the existing electrical system is replaced under a single electrical permit or within a 12-month period, all of the provisions of Section C409 shall be met.

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**AMENDMENTS TO CHAPTER 6**

**CHAPTER 6  
 REFERENCED STANDARDS**

**The following sections, ASHRAE and HVI, of the Referenced Standards Table is amended to read as follow:**

<b>ASHRAE</b>	American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. 1791 Tullie Circle, NE Atlanta, GA 30329-2305	Referenced in code section number
Standard reference number	Title	
ANSI/ASHRAE/ACCA Standard 127-2007	Method of Testing for Rating Computer and Data Processing Room Unitary Air Conditioners	C403.4.1
Standard 183—2007	Peak Cooling and Heating Load Calculations in Buildings, Except Low-rise Residential Buildings.....	C403.1.2
ANSI/ASHRAE/ASHE Standard 170-2017	Ventilation of Health Care Facilities.....	C403.1.1
ASHRAE—2016	ASHRAE HVAC Systems and Equipment Handbook—2004.....	C403..1.2

ISO/AHRI/ASHRAE 13256-1 (2011)	Water-source Heat Pumps—Testing and Rating for Performance— Part 1: Water-to-air and Brine-to-air Heat Pumps ..... Table C403.3.2(2)
ISO/AHRI/ASHRAE 13256-2 (2011)	Water-source Heat Pumps—Testing and Rating for Performance— Part 2: Water-to-water and Brine-to-water Heat Pumps ..... Table C403.3.2(2)
90.1— <del>2016</del> <u>2019</u>	Energy Standard for Buildings Except Low-rise Residential Buildings ..... C402.1.5.1, C407.3
90.4— <del>2016</del> <u>2019</u>	Energy Standard for Data Centers ..... C403.1.3
146—2011	Testing and Rating Pool Heaters ..... Table C404.2

**HVI**

Home Ventilating Institute  
1740 Dell Range Blvd., Ste H.450  
Cheyenne, WY 82009

Standard reference number	Title	Referenced in code section number
<u>HVI 916—2015</u>	<u>Home Ventilating Institute Airflow Test Procedure 916-2015</u>	<u>C403.8.4</u>
<u>HVI 920—2020</u>	<u>Product Performance Certification Procedure Including Verification and Challenge 920-2020</u>	<u>C403.3.6</u>



**APPENDIX A is amended to read as follows:**

**APPENDIX A  
DEFAULT HEAT LOSS COEFFICIENTS**

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**TABLE A102.2.6(1)  
ASSEMBLY U-FACTORS FOR ROOFS WITH TAPERED INSULATION ENTIRELY ABOVE DECK  
SINGLE SLOPE RECTANGULAR TO ONE-SIDE((d,f,g,h,i)) a,d,g,h,i,j  
(UNINTERRUPTED BY FRAMING)  
*[The remainder of the table is not shown]***

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**TABLE A102.2.6(2)  
ASSEMBLY U-FACTORS FOR ROOFS WITH TAPERED INSULATION ENTIRELY ABOVE DECK  
SLOPED TRIANGLE (ROOF WITH CENTER DRAIN)((e,f,g,h,i)) a,b,e,g,h,i,j  
(UNINTERRUPTED BY FRAMING)  
*[The remainder of the table is not shown]***

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**TABLE A102.2.6(3)  
ASSEMBLY U-FACTORS FOR ROOFS WITH TAPERED INSULATION ENTIRELY ABOVE DECK  
SLOPED TRIANGLE (ROOF WITH PERIMETER DRAINS)((e,f,g,h,i)) a,c,f,g,h,i,j  
(UNINTERRUPTED BY FRAMING)**

i

Footnotes to Tables A102.2.6.1, A102.2.6.2, and A102.2.6.3:

- a. R<sub>max</sub> and R<sub>min</sub> are determined along the linearly tapered cross section for the respective ~~minimum and maximum~~ and minimum thickness values for the roof section being analyzed.
- b. For triangular roof sections with insulation sloping to the center, R<sub>max</sub> refers to the insulation value along the long edge of the triangle and R<sub>min</sub> to the insulation at the point of the triangle ~~which assumes that the insulation slopes to the center~~.
- c. For triangular roof sections with insulation sloping to the perimeter, R<sub>max</sub> refers to the insulation value at the point of the triangle and R<sub>min</sub> to the insulation along the long edge of the triangle which assumes that the insulation slopes to the perimeter.
- d. Effective U-factor for R-value of rectangular tapered insulation is calculated as follows:

$$R_{eff} = (R_{max} - R_{min}) / \ln \left[ \frac{R_{max}}{R_{min}} \right]$$

- e. Effective U-factor for R-value of triangular tapered insulation sloping to the center is calculated as follows:

$$R_{eff} = \left[ \frac{2}{R_{max} - R_{min}} \left[ 1 + \frac{R_{min}}{R_{max} - R_{min}} \ln \left[ \frac{R_{min}}{R_{max}} \right] \right] \right]^{-1}$$

- f. Effective R-value of triangular tapered insulation sloping to the perimeter is calculated as follows:

$$R_{eff} = \left[ \frac{2}{R_{min} - R_{max}} \left[ 1 + \frac{R_{max}}{R_{min} - R_{max}} \ln \left[ \frac{R_{max}}{R_{min}} \right] \right] \right]^{-1}$$

- g. Assembly U-factors include the effective R-value of the tapered insulation, an exterior air film (R=0.17) and an interior air film, horizontal with heat flow up (R=0.61).

- h. For effective U-factors of roof assemblies with different R<sub>max</sub> or R<sub>min</sub> values not listed in the tables interpolation is allowed. For effective U-factors of roof assemblies with R<sub>max</sub> greater than the values listed in the tables, the effective U-factor must be calculated using the effective R-value calculations above.

- i. This table shall only be applied to tapered insulation that is tapered along only one axis.

- j. In areas of differing insulation slopes/configurations, individual U-values U-factors shall be calculated and an area weighted U-value U-factor calculation shall be used to determine the effective value of the roof.



**Appendix D is amended as follows:**

**APPENDIX D  
CALCULATION OF HVAC TOTAL SYSTEM PERFORMANCE RATIO**

**Section D101 is amended to read as follows:**

**D101 Scope.** This appendix establishes criteria for demonstrating compliance using the *HVAC total system performance ratio* (HVAC TSPR) for systems serving office, retail, library, and education occupancies and buildings, which are subject to the requirements of Section C403.3.5 without exception and dwelling units and common areas within multifamily buildings. Those HVAC systems shall comply with Section C403 and this appendix as required by Section C403.1.1.

**Table C407.1 is amended to read as follows:**

**TABLE C407.1 CARBON EMISSIONS FACTORS**

Type	CO <sub>2</sub> e (lb/unit)	Unit
Electricity	0.70	kWh
Natural gas	11.70	Therm
Oil	19.2	Gallon
Propane	10.5	Gallon
Other <sup>a</sup>	195.00	mmBtu
On-site renewable energy <sup>b</sup>	0.00	

- a. District energy systems may use alternative emissions factors supported by calculations approved by the *code official*.
- b. The TSPR calculation does not separately account for the use of renewable energy.

**Section D601.2.1 is amended to read as follows:**

**D601.2.1 Number of blocks.** One or more *blocks* may be required per building based on the following restrictions:

1. Each *block* can have only one occupancy type (multifamily dwelling unit, multifamily common area, office, library, education, or retail). Therefore, at least one single *block* shall be created for each unique use type.
2. Each *block* can be served by only one type of HVAC system. Therefore, a single *block* shall be created for each unique HVAC system and use type combination. Multiple HVAC units of the same type may be represented in one *block*. Table D601.10.2 provides directions for combining multiple HVAC units or components of the same type into a single *block*.
3. Each *block* can have a single definition of floor to floor or floor to ceiling heights. Where floor heights differ by more than two feet, unique *blocks* should be created for the floors with varying heights.
4. Each *block* can include either above grade or below grade floors. For buildings with both above grade and below grade floors, separate *blocks* should be created for each. For buildings with floors partially above grade and partially below grade, if the total wall area of

the floor(s) in consideration is greater than or equal to 50 percent above grade, then it should be simulated as a completely above grade *block*, otherwise it should be simulated as a below grade *block*.

5. Each wall on a façade of a *block* shall have similar vertical fenestration. The product of the proposed design U-factor times the area of windows (UA) on each façade of a given floor cannot differ by more than 15 percent of the average UA for that façade in each *block*. The product of the proposed design SHGC times the area of windows (USHGC) on each façade of a given floor cannot differ by more than 15 percent of the average USHGC for that façade in each *block*. If either of these conditions are not met, additional *blocks* shall be created consisting of floors with similar fenestration.
6. For a building model with multiple *blocks*, the *blocks* should be configured together to have the same adjacencies as the actual building design.

**Section D601.4.1 is amended to read as follows:**

**D601.4.1 Occupancy type.** The occupancy type for each *block* shall be consistent with the building area type as determined in accordance with C405.4.2.1. Portions of the building that are building area types other than multifamily, office, school (education), library, or retail shall not be included in the simulation.

**Section D601.4.2 is amended to read as follows:**

**D601.4.2 Occupancy schedule, density, and heat gain.** The occupant density, heat gain, and schedule shall be for multifamily, office, retail, library, or school as specified by ASHRAE Standard 90.1 Normative Appendix C.

**Section D601.06 is amended to read as follows:**

**D601.6 Lighting.** Interior lighting power density shall be equal to the allowance in Table C405.4.2(1) for multifamily, office, retail, library, or school. The lighting schedule shall be for multifamily, office, retail, library, or school as specified by ASHRAE Standard 90.1 Normative Appendix C. The impact of lighting controls is assumed to be captured by the lighting schedule and no explicit controls shall be modeled. Exterior lighting shall not be modeled.

**Section D601.7 is amended to read as follows:**

**D601.7 Miscellaneous equipment.** The miscellaneous equipment schedule and power shall be for multifamily, office, retail, library, or school as specified by ASHRAE Standard 90.1 Normative Appendix C. The impact of miscellaneous equipment controls is assumed to be captured by the equipment schedule and no explicit controls shall be modeled.

**Exceptions.**

1. Multifamily dwelling units shall have a miscellaneous load density of 0.42 W/ft<sup>2</sup>
2. Multifamily common areas shall have a miscellaneous load density of 0 W/ft<sup>2</sup>

**Table D601.11.2 is amended to read as follows:**

**TABLE D601.11.2  
 PROPOSED BUILDING SYSTEM PARAMETERS**

Category	Parameter	Fixed or User Defined	Required	Applicable Systems
HVAC System Type	System Type	User Defined	Selected from Table D601.11.1	All
System Sizing	Design Day Information	Fixed	99.6% heating design and 1% dry-bulb and 1% wet-bulb cooling design	All
	Zone Coil Capacity	Fixed	Sizing factors used are 1.25 for heating equipment and 1.15 for cooling equipment	All
	Supply Airflow	Fixed	Based on a supply-air-to-room-air temperature set-point difference of 20°F	1-11
		Fixed	Equal to required outdoor air ventilation	12
Outdoor Ventilation Air	Outdoor Ventilation Air Flow Rate	Fixed	As specified in ASHRAE Standard 90.1 Normative Appendix C, adjusted for proposed DCV control	All
System Operation	Space Temperature Setpoints	Fixed	As specified in ASHRAE Standard 90.1 Normative Appendix C, <u>except multifamily which shall use 68°F heating and 76°F cooling setpoints</u>	1-11
	Fan Operation – Occupied	User Defined	Runs continuously during occupied hours or cycled to meet load	1-11
	Fan Operation – Occupied	Fixed	Fan runs continuously during occupied hours	12
	Fan Operation – Night Cycle	Fixed	Fan cycles on to meet setback temperatures	1-11
Packaged Equipment Efficiency	DX Cooling Efficiency	User Defined	Cooling COP without fan energy calculated in accordance with ASHRAE Standard 90.1 Section 11.5.2c <sup>b</sup>	1, 2, 3, 4, 5, 7, 8, 9, 11, 12
	Heat Pump Efficiency	User Defined	Heating COP without fan energy calculated in accordance with ASHRAE Standard 90.1 Section 11.5.2c <sup>c</sup>	2, 4, 5, 7, 8
	Furnace Efficiency	User Defined	Furnace thermal efficiency <sup>c</sup>	3, 11
Heat Pump Supplemental Heat	Control	Fixed	Supplemental electric heat locked out above 40°F. Runs In conjunction with compressor between 40°F and 0°F.	2, 4
System Fan Power	Design Fan Power (W/cfm)	User Defined	Input electric power for all fans in required to operate at <i>fan system design conditions</i> divided by the supply airflow rate	All
	Single Zone System Fan Power During Dead band (W/cfm)	User Defined	W/cfm during dead band for VAV or multispeed single zone fans	3, 4, 5, 6, 7, 8
Variable Air Volume Systems	Part Load Fan Controls	User Defined	VFD included. User specifies presence of static pressure reset.	9, 10, 11
	Supply Air Temperature Controls	User Defined	If not SAT reset constant at 55°F. SAT reset results in 60°F SAT during low load conditions	9, 10, 11

	Minimum Terminal Unit airflow percentage	User Defined	Average minimum terminal unit airflow percentage for <i>block</i> weighted by cfm	9, 10, 11
	Terminal Unit Heating Source	User Defined	Electric or hydronic	9, 10, 11
	Fan Powered Terminal Unit (FPTU) Type	User Defined	Series or parallel FPTU	11
	Parallel FPTU Fan	Fixed	Sized for 50% peak primary air at 0.35 W/cfm	11
	Series FPTU Fan	Fixed	Sized for 50% peak primary air at 0.35 W/cfm	11
Economizer	Economizer Presence	User Defined	Yes or No	3, 4, 9, 10, 11
	Economizer ((High Limit)) Control Type	Fixed	((75°F fixed)) <u>Differential</u> dry-bulb	3, 4, 9, 10, 11

**Table D602.11 is amended to read as follows:**

**TABLE D602.11  
 STANDARD REFERENCE DESIGN HVAC SYSTEMS**

Parameter	Building Type				
	Large Office <sup>a</sup>	Small Office and Libraries <sup>a</sup>	Retail	School	<u>Multifamily</u>
System Type	Water-source Heat Pump	Packaged air-source Heat Pump	Packaged air-source Heat Pump	Packaged air-source Heat Pump	<u>Packaged air-source Heat Pump</u>
Fan control <sup>b</sup>	Cycle on load	Cycle on load	Cycle on load	Cycle on load	<u>Cycle on load</u>
Space condition fan power (W/cfm)	0.528	0.528	0.522	0.528	<u>0.528</u>
Heating/Cooling sizing factor <sup>c</sup>	1.25/1.15	1.25/1.15	1.25/1.15	1.25/1.15	<u>1.25/1.15</u>
Supplemental heating availability	NA	<40°F	<40°F	<40°F	<u>&lt;40°F</u>
Modeled cooling COP (Net of fan) <sup>d</sup>	4.46	3.83	4.25	3.83	<u>3.83</u>
Modeled heating COP (Net of fan) <sup>d</sup>	4.61	3.81	3.57	3.81	<u>3.86</u>
Cooling Source	DX (heat pump)	DX (heat pump)	DX (heat pump)	DX (heat pump)	<u>DX (heat pump)</u>
Heat source	Heat Pump	Heat Pump	Heat Pump	Heat Pump	<u>Heat Pump</u>
OSA Economizere <sup>e</sup>	No	No	Yes	Yes	<u>Yes</u>
Occupied ventilation source <sup>f</sup>	DOAS	DOAS	DOAS	DOAS	<u>DOAS</u>
DOAS Fan Power (W/cfm of outside air)	0.819	0.819	0.730	0.742	<u>0.78</u>
DOAS temperature control <sup>g, h</sup>	Bypass	Wild	Bypass	Bypass	<u>Wild</u>
ERV efficiency (sensible only)	70%	70%	70%	70%	<u>70%</u>
WSHP Loop Heat Rejection	Cooling Tower <sup>i</sup>	NA	NA	NA	<u>NA</u>
WSHP Loop Heat Source	Gas Boiler <sup>i</sup>	NA	NA	NA	<u>NA</u>
WSHP Loop Temperature Control <sup>k</sup>	50°F to 70°F	NA	NA	NA	<u>NA</u>
WSHP circulation Pump W/gpm <sup>l</sup>	100-124	NA	NA	NA	<u>NA</u>

Parameter	Building Type				
	Large Office <sup>a</sup>	Small Office and Libraries <sup>a</sup>	Retail	School	<u>Multifamily</u>
WSHP Loop Pumping Control <sup>m</sup>	HP Valves & pump VSD	NA	NA	NA	<u>NA</u>

Footnotes to Table D602.11

- a. Offices <50,000 ft<sup>2</sup> use “Small Office” parameters; otherwise use “Large Office” parameters.
- b. Space conditioning system shall cycle on to meet heating and cooling set point schedules as specified in ASHRAE Standard 90.1 Normative Appendix C. One space conditioning system is modeled in each zone. Conditioning system fan operation is not necessary for ventilation delivery.
- c. The equipment capacities (i.e. system coil capacities) for the *standard reference design* building design shall be based on design day sizing runs and shall be oversized by 15% for cooling and 25% for heating.
- d. COPs shown are direct heating or cooling performance and do not include fan energy use. See 90.1 appendix G (G3.1.2.1) for separation of fan from COP in packaged equipment for units where the efficiency rating includes fan energy (e.g., SEER, EER, HSPF, COP).
- e. Economizer on space conditioning systems shall be simulated when outdoor air conditions allow free cooling. Economizer high limit shall be based on differential dry-bulb control. DOAS system continues to operate during economizer mode.
- f. Airflow equal to the outside air ventilation requirements is supplied and exhausted through a separate DOAS system including a supply fan, exhaust fan, and sensible only heat exchanger. No additional heating or cooling shall be provided by the DOAS. A single DOAS system will be provided for each *block*. The DOAS supply and return fans shall run whenever the HVAC system is scheduled to operate in accordance with ASHRAE Standard 90.1 Normative Appendix C.
- g. “Wild” DOAS control indicates no active control of the supply air temperature leaving the DOAS system. Temperature will fluctuate based only on entering and leaving conditions and the effectiveness of ERV.
- h. “Bypass” DOAS control includes modulating dampers to bypass ERV with the intent to maintain supply air temperature at a maximum of 60°F when outside air is below 75°F. Once outside air is above 75°F bypass dampers will be fully closed.
- i. Includes a single axial fan cooling tower with variable-speed fans at 40.2 gpm/hp, sized for an approach of 10°F and a range of 10°F.
- j. Includes a single natural draft boiler with 80% Et.
- k. Loop boiler and heat rejection shall be controlled to maintain loop temperature entering heat pumps between 50°F and 70°F.
- l. Pump motor input power shall be 16 W/gpm.
- m. Loop flow shall be variable with variable speed drive pump and unit fluid flow shutoff at each heat pump when its compressor cycles off.

## ATTACHMENT B

### **2018 SEATTLE ENERGY CODE OUTREACH**

Seattle conducted 20 hours of public energy code review across four meetings in January and four more in September of 2020, plus hundreds of follow-up exchanges with local engineers.

The proposed code has been presented at three meetings of the Construction Codes Advisory Board (CCAB), with a fourth presentation scheduled for this week. CCAB is made up of 13 professionals and citizens appointed by the Seattle Mayor and confirmed by Seattle's City Council. It gives the city input about the construction codes, and reviews new construction codes and new code editions.

Separate presentations have been made for numerous stakeholder groups, including:

- NAIOP Sustainable Development Committee
- Seattle 2030 District
- AIA Seattle
- AIA Washington
- Construction Specifications Institute
- McKinstry
- Shift Zero
- Seattle Housing Authority
- Housing Development Consortium
- Exemplary Buildings Task Force
- Labor organizations:
  - Washington State Labor Council: Vlad Gutman
  - MLK Labor Council (umbrella council in KC): Nicole Grant and Katie Garrow
  - Monty Anderson, Building Trades Council (invited)
  - UA Local 32 – Plumbers, Pipefitters: Chris Hawes
  - IBEW (electricians): Keith Weir
  - Sheetmetal workers Local 66
  - Laborers: Dale Bright
  - Insulators
- Emerald Cities
- AIA Medical Design Forum
- IBPSA (Energy modelers)
- Seattle Building Enclosure Council
- Washington State Solar Summit
- Washington Glass Association
- SAB Architects
- Port of Seattle
- Association of Hotel Engineers
- American Society of Plumbing Engineers
- BOMA Seattle/King County



- IAPMO (International Association of Plumbing and Mechanical Officials)
- NW Energy Coalition (NVEC)\*
  - Skanska
  - Vulcan
  - Security Properties
  - Sustainable Living Innovations
  - Seattle Housing Authority
  - Community Roots Housing

\*The NW Energy Coalition, as a partner of the American Cities Climate Challenge, has also conducted engagement with members of the development community, the affordable housing community, building professionals, environmental organizations, and other stakeholders interested in the Seattle Energy Code, and has shared relevant and collated feedback with City of Seattle staff.

These presentations and discussions, together with follow-up communications, have resulted in numerous changes and refinements being incorporated into the draft code proposals.

#### 2018 Seattle Energy Code Changes in Response to Stakeholder Comments

Note: The great majority of the proposed energy code changes came originally from stakeholders and were refined over the course of 2020 through 20 hours of public meetings and hundreds of phone and email exchanges. Relatively few of the proposals are unchanged from the first drafts. Only a selection of the code changes instigated by stakeholder comments are listed here.

- C401.3.6 Demonstration of operating energy use (changes from McKinstry to align with other rules)
- C401.3.11 Adjustment for commercial kitchens and other large loads. Documentation of internal policy typically applied to process loads from kitchens, laundries, etc. Rushing.
- C402.1.1.2 Semi-heated spaces. Clarification of rules for infrared heaters. From Mike Kennedy.
- Table C402.1.3, footnote I. Took requirement out of table and relocated to footnote. McKinstry.
- C402.1.2 Mech equipment penetrating walls. Clarification that the “equipment” doesn’t include ducts and louvers. Rushing.
- Table C402.1.4 – additional table values for concrete columns below deck and concrete slab floor above utility vault. Rushing.
- C402.2.1. Roof assembly. Struck reference to tapered roof insulation assemblies and substituted a more thorough description in Appendix A. JRS Engineering.
- Table C402.4 Fenestration U-factors. Added separate category with higher allowable U-factor for operable windows. Marty Kooistra – Housing Development Consortium.
- C402.2.9 Cantilevered slabs. Deleted original limitation of 25% max perimeter decks. Rushing.

- C402.4.1.1. Vertical fenestration maximum area. Change 30% area threshold for high-performance alternatives to 35%. Rushing.
- C403.1.1, TSPR, exception 4. Added cap on proportion of air-cooled chillers in exception 4, to prevent loophole. Mike Kennedy.
- C403.1.3 Data centers. Revised reference to 2019 edition of ASHRAE 90.4 and struck WA amendments. Jeff Sloan.
- C403.1.4 limits on electric resistance and fossil fuel heating. Extensively rewritten based on input from multiple engineers, including McKinstry, Rushing, Ecotope, and others.
- C403.1.4 Limits on electric resistance and fossil fuel heating. Effective date changed to January 1, 2022. Rushing.
- C403.1.4 Limits on electric resistance and fossil fuel heating. Allowance for electric resistance heating in corner rooms raised from 750 W to 1000 W. Also, exceptions for temporary systems, emergency generators, and pasteurization processes. Rushing,
- C403.3.2 HVAC Equipment performance. Revised language to reflect that certain classes of HVAC equipment are not yet tested to the referenced standard. Rushing, AHRI.
- Table C403.3.2(13) Heat pump and heat recovery chiller packages – new footnotes. Clarify application of table values. Rushing.
- C403.3.5.1 Energy recovery ventilation with DOAS. New exception allowing hotel and multifamily occupancies to use sensible heat rather than enthalpy to meet 60% requirement.
- C403.3.6 Group R-2 ventilation – Informative Note. Mike Moore, Home Ventilating Institute.
- C403.7.6 Energy recovery ventilation, informative note. Correct formula error and added note. Hermanson.
- C403.8.3 Fan efficacy. Added exception allowing FEI standard to be used in lieu of FEG. AMCA International.
- Table C403.8.4 Group R Fan Efficacy. Added ERV/HRV row, clarified table values, and corrected headers. Mike Moore, Newport Ventures, Rushing, Mike Kennedy.
- C403.10.2.3 High-pressure ducts. Clarification of code application. Rushing.
- C403.10.4 Refrigerant piping insulation. Added for documentation of SDCI interpretation. Rushing.
- C404.2.3 Group R-1/R-2 central service water heating. Extensive revisions to system sizing, elimination of storage sizing requirements, and changes to supplemental electric resistance requirements. Rushing and Ecotope, and several others.
- Table C404.3.1 Pipe volume and maximum pipe length. Extended allowable pipe length for public lavatories from 2 feet to 8 feet. Multiple commenters.
- C404.6.1 Unfired storage tank insulation. Rewritten to avoid conflict with federal rules. AHRI, AO Smith, Bradford White.
- C404.7.1.2 Multiple riser systems. Language reorganization for clarity. O'Brien 360.

- C405.4.1 Interior lighting power. Added exception for germicidal lighting. Sparklab.
- Table C405.4.2.2 Interior lighting power allowances. Added additional allowance for decorative lighting in corridors. Sparklab.
- C405.7.1 Electrical receptacles at dwelling unit gas appliances. Changed requirement to 8000 VA for 208-volt installations. Multiple commenters.
- C406.1.1 Tenant spaces. Clarifying language. McKinstry.
- Table C406.1 Credits. Add 1/3 and 2/3 credit for partial solar. McKinstry.
- C406.2 HVAC. Clarifying language. Mike Kennedy.
- C406.5 Renewable energy. Clarifying language. Mike Kennedy, McKinstry.
- C407.3 Performance-based compliance. Clarification of calculation method, alignment with ASHRAE Appendix G. PNNL, McKinstry, Rushing.
- Table C407.2 Mandatory measures. Add renewable energy C412. Rushing.
- C407.3.1 Limits on substandard building envelope. Change 0% threshold to 10%. Rushing.
- C409.1.3 Meters for gas usage at individual multifamily units. Strike requirement. Multiple commenters (violates PSE regulation)
- C410.2 Walk-in refrigerated coolers, freezers, and warehouses. Clarify application of code requirement. Rushing.
- C411.8 Photovoltaic interconnection. Correct roof penetration provision. A&R Solar.
- C412.1 Renewable energy. Allow interpolation. Add state agency to informative note. McKinstry, Washington State Housing Finance Commission.

**From:** Loh, Julien <[Julien.Loh@pse.com](mailto:Julien.Loh@pse.com)>  
**Sent:** Thursday, October 14, 2021 4:12 PM  
**To:** Ray Allshouse <[rallshouse@shorelinewa.gov](mailto:rallshouse@shorelinewa.gov)>  
**Cc:** Loh, Julien <[Julien.Loh@pse.com](mailto:Julien.Loh@pse.com)>  
**Subject:** [EXTERNAL] PSE comments on energy code updates

**CAUTION:** This email originated from outside of the City of Shoreline. Do not click links or open attachments unless you recognize the sender and know the content is safe.

Hi, Ray. Thanks for letting PSE provide some additional info as Shoreline considers energy code updates. The comments below share some additional background on what we have discussed like capacity shortfalls and affordability.

Happy to discuss further if needed and appreciate you engaging PSE.

Earlier this year, Puget Sound Energy set an aspirational goal to be a Beyond Net Zero Carbon company by 2045: PSE will target reducing its own carbon emissions to net zero and go beyond by helping other sectors to enable carbon reduction across the state of Washington. Our goal is to reduce emissions from PSE electric supply and electric and gas operations to net zero by 2030. By 2045, PSE will have a 100% carbon-free electric supply. We also strive to reach net zero carbon emissions for natural gas sales by 2045—customer use in homes and businesses—with an interim target of a 30% emissions reduction by 2030. Our goal is to partner with customers and industry to identify programs and products that cost-effectively reduce carbon across sectors and across our region and state. Examples include transportation through EV implementation and the support of low carbon fuels, upstream methane emission reduction, and RNG projects for municipal solid waste, agricultural waste, and forestry sources.

A critical component will be balancing clean energy goals with customer expectations for uncompromised reliability, safety, and affordability. PSE is committed to ensuring that all customers and communities have access to and benefit from the transition to a clean energy future. The challenge to protect the most vulnerable and remain sustainable will necessitate healthy and complementary electric and natural gas energy systems, as well as other technologies that may not yet be commercially feasible, to maintain both affordability and reliability.

### **Serving Peak Loads**

PSE plans its energy service capacity based on peak loads. To address capacity constraints, PSE actively uses energy conservation efforts to balance the necessity of major investments in new transmissions lines, new generation facilities, and distribution. By managing loads, and specifically peak loads, with energy conservation efforts we are able to protect our customers' energy bills from some of the costs of these system upgrades. An approach based solely on the electrification of energy use unnecessarily drives peak use higher. Peak energy use in the Puget Sound area is driven by cold winter temperatures and the associated space-heating loads in residential and commercial buildings. Switching to all-electric heat pump systems with electric resistance backup is not an efficient way to meet these energy demands and will drive peak electric loads higher.

### **Natural Gas as a backup**

PSE's natural gas distribution system is a valuable asset that is in the ground providing service today and has significant potential to grow towards a carbon neutral system. Natural gas is a viable energy supply

during these peak load events and should be included as a backup in plans for how buildings are heated in the future. Electrification on its own is not a complete solution when considering peak supply issues. The equipment needed to provide dual fuel or hybrid heating is currently a niche market in the commercial and multifamily building fields. This is a relatively new technology that requires sufficient time to mature, analogous to the technology advancements observed with wind turbines, solar panels, and battery storage over the last few decades. A strict blanket ban on the use of this emerging technology will disincentivize the needed development and adoption to bring hybrid heating to maturity.

### **RNG and Hydrogen**

In King County's Strategic Climate Action Plan, targets are set for the reduction of fossil fuels in the built environment which include the use of both renewable natural gas and traditional natural gas supplies containing blended renewable hydrogen. PSE has been working with RNG for years, including with King County, and is actively increasing its RNG supply. We are also piloting various options for hydrogen blends in our natural gas system. PSE strongly advocates for revisions to the proposed code amendments to allow for the use of hydrogen blends and renewable natural gas for all uses in all buildings.

### **Affordability**

Codes that ban the use of an entire energy system such as natural gas have a two-fold financial impact to Shoreline residents.

1) Cost impacts to electricity rates: Electrification policies push up peak loads which drive the need for major infrastructure investments. These investments increase what customers pay for their electricity. These cost increases are inequitable, hitting low income customers the hardest.

2) Cost impacts to housing: Electrification policies require electric heating systems that are more expensive. There are limited options on the market and the supply chains for those options are not fully developed. This is particularly challenging in the context of providing housing that is affordable for low and middle income families. The county should provide as many pathways as possible for developers and contractors to achieve carbon reductions in their buildings, not limit options to expensive solutions.

### **Greenhouse Gas Standards**

Rather than the county deciding how buildings will reduce their carbon emissions, performance based building codes with specific targets for carbon emissions reductions should be used. This allows customers to choose how to best meet the carbon reduction target, whether that is through their choice of energy or through energy efficiency investments in the building or its appliances.

Another alternative strategy would be to deploy an early adopter program for several years so that the industry can accumulate more experience with installing and operating newer systems. That timeframe also allows for more options to become market ready. Several years is a more accurate, though still ambitious, timeline for the market acceptance of new systems. The implementation timeline should reflect the needs of the market readiness rather than asking developers and customers to finance unproven technology in their homes and businesses.

PSE considers Shoreline's proposed ban on all forms of carbon-based heating in commercial and multifamily residential buildings to be shortsighted. This action does not take into consideration advancements in net carbon reduction of natural gas or in building heating equipment technologies. It

will significantly impact the effort to keep energy prices affordable, particularly for those reliant on multi-family housing. For all of these reasons, and barring implementation of PSE's above suggestions, PSE urges Shoreline to adopt the 2018 IBC Energy Code as provided by the WA State Building Council without adopting the additional provisions that both eliminate present and future heating options and create a financial burden on the citizens of Shoreline.

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