Bull Run Filtration Projects
Land Use Applications

Applications Narrative Guide

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Updated April 17, 2023

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Relation to Other Narrative Sections

Section 1.C contains all the information listed in Section 39.7560, Application Requirements including professional reports, findings, and analysis demonstrating that the communications tower meets applicable CU approval criteria found in MCC 39.7565. Pursuant to Section 39.7570, the communications tower is also subject to design review (DR). While DR may be implemented as a condition of approval, this Section 1.C addresses all of the applicable DR criteria and demonstrates that the proposed tower contains all of the required DR application requirements and meets all the required DR criteria.

Where relevant, the conditional use and DR narratives will cross reference findings in the balance of this consolidated application and will incorporate those findings by specific reference. Defined terms used in this Section 1.C are provided in the overall application **Introduction**.

Communications Tower Location and Description

The Water Bureau proposes to install a self-supporting lattice communications tower, including a microwave dish, radio antenna, and accessory communications equipment. The proposed filtration facility will be critical for the delivery of drinking water to nearly one million Oregonians. Operation of this critical facility will require the use of microwave communications and data infrastructure at the project site. The communication tower will serve as a data conduit, allowing the City to route phone calls, computer communication, and data from the Water Bureau's Supervisory Control and Data Acquisition (SCADA) system, to other locations in the region. The communications network also serves a critical role as the conduit for 800 MHz radio communications. The City has a series of towers throughout the region to carry this communication traffic. The proposed filtration facility will require similar communication to support its operation. The tower will have the minimum footprint and height needed to perform these critical functions. The tower has been designed to eliminate the need for any guy wires spanning from the structure to a larger circumference around the tower which would otherwise effectively increase the tower footprint. The 180-foot communications tower is the minimum height needed for the microwave dish to perform two critical functions:

- Be sufficiently above the tree line to ensure line-of-sight to the Lookout Point Tower; and
- Maintain SCADA communications line-of-sight to repeaters at Mount Scott, Council Crest, Prune Hill, and Willalatin.

Figure 1 shows the proposed location of the communications tower on the filtration facility site. The lower portion of the lattice tower will be painted green to blend in with adjacent trees; the upper portion of the tower will be galvanized (silver-toned) to blend in with the sky. The communications tower is proposed in the north-central portion of the site behind an existing evergreen tree grove and adjacent to the forest along the north edge of the site.

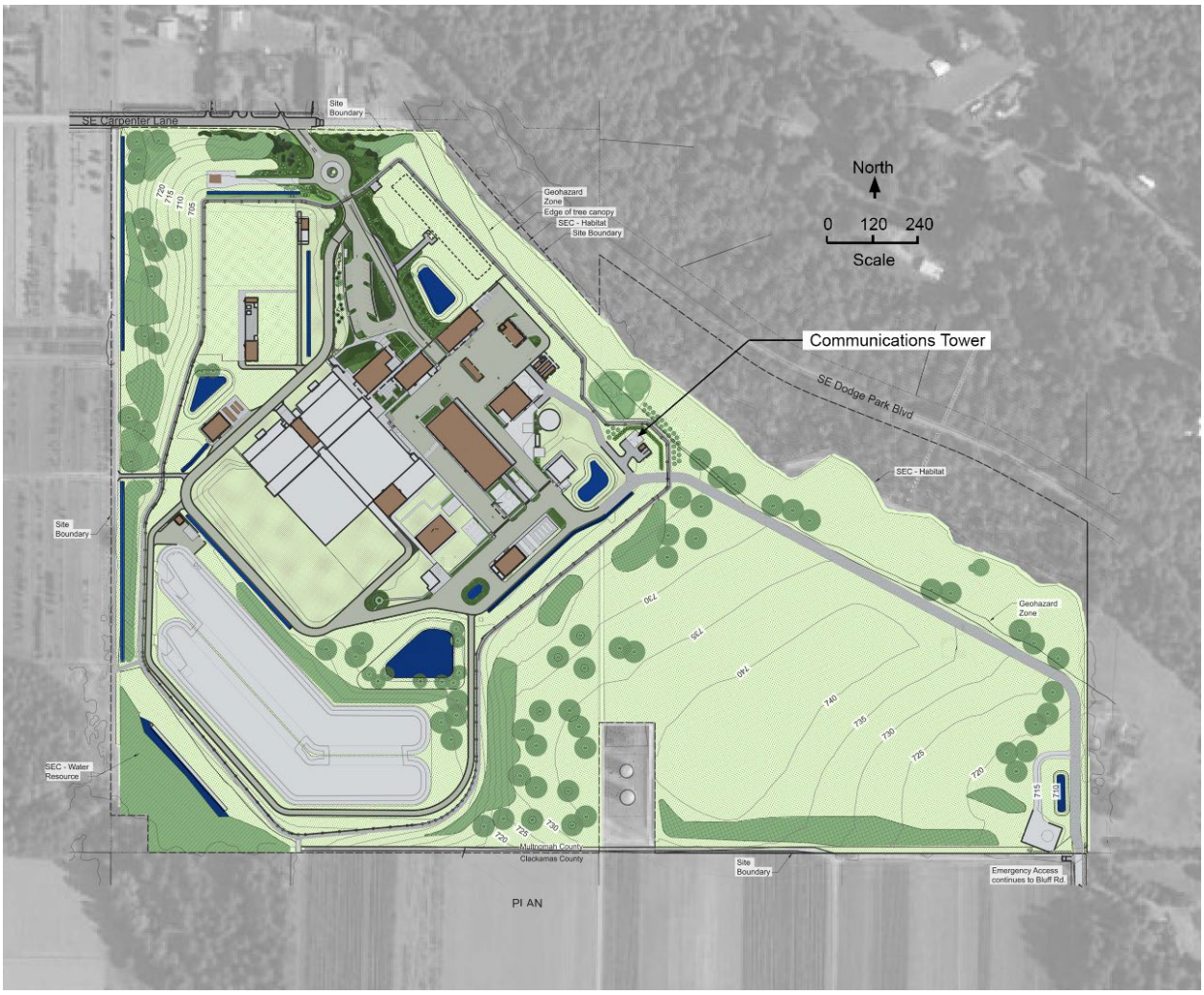

Figure 1. Proposed Communication Tower Location on the Filtration Facility Site

Tower Standards and Criteria

MCC 39.7500 Purpose

> *This subpart of MCC Chapter 39 provides for the review and approval of the location and development of special uses which, by reason of their public convenience, necessity, unusual character or effect on the neighborhood, may be appropriate as specified in each base zone.*

Response: This purpose statement is not an approval criterion or an application submittal requirement. However, it does correctly set out the reasons for this application. The filtration facility and related communications tower, which will provide reliable, high-quality drinking water for nearly one million people, is a needed special use. And by reason of its public necessity is appropriate as a community service use under the MCC at the facility site. The communications tower is a critical component needed to support filtration facility operations.

The Water Bureau requires a communication tower at this location for several reasons:

- It serves as data conduit, allowing the Water Bureau to route phone calls, computer communication, and SCADA system data to other locations in the region.
- It will be part of a microwave network that serves a critical role as the conduit for 800 MHz radio communications. The Water Bureau has a series of towers throughout the region to carry this communication traffic. In addition to routine communication traffic, 800 MHz radio communications would allow for improved emergency fire, police, and medical response.
- The proposed filtration facility requires this level of network communication capability to support its operations and locating the tower at this site also provides the needed security for this critical public infrastructure, inside a secure perimeter and at a facility that is attended by trained professionals at all hours.

MCC 39.7505 General Provisions

(A) Community Service approval shall be for the specific use or uses approved together with the limitations or conditions as determined by the approval authority.

Response: As explained in the **Section 1** overview and in response to MCC 39.7500, both the filtration facility and the communications tower are listed and recognized as community service uses and both are proposed on the filtration facility site. Thus, this request for approval is limited to the specific uses that are listed as conditional community service uses in the subject zone.

(B) Uses authorized pursuant to this section shall be subject to Design Review approval under MCC 39.8000 through 39.8050.

Response: The communications tower is subject to DR under MCC Section 39.7570. Under that section, design can be imposed as a condition of approval. However, the applicant in this case is not deferring DR but is instead seeking DR approval as part of this application. Compliance with the DR criteria and development standards as applied to the communications tower is addressed below. **Section 1.B** addresses applicable DR criteria and development standards for the filtration facility itself.

MCC 39.7510 Conditions and Restrictions

The approval authority may attach conditions and restrictions to any community service use approved. Conditions and restrictions may include a definite time limit, a specific limitation of use, landscaping requirements, parking, loading, circulation, access, performance standards, performance bonds, and any other reasonable conditions, restrictions or safeguards that would uphold the purpose and intent of this Chapter and mitigate any adverse effect upon the adjoining properties which may result by reason of the conditional use allowed.

Response: The Water Bureau recognizes that this is a conditional use application for a necessary and critical public infrastructure project. As such there are multiple technical requirements for this specialized use. The Water Bureau has designed the communications tower to minimize the height and footprint while ensuring that the tower can serve intended functions. Through public outreach, technical studies, careful siting and design considerations, the Water Bureau has proposed conditions and restrictions that will uphold the purpose statement for community service uses and minimize any adverse effects on adjoining properties. The Water Bureau has implemented all these design and placement recommendations from the technical and design studies.

MCC 39.7515 Approval Criteria

A. In approving a Community Service use, the approval authority shall find that the proposal meets the following approval criteria, except for transmission towers, which shall meet the approval criteria of MCC 39.7550 through 39.7575 .[…]

Response: This proposal is for a radio transmission tower and therefore the criteria of MCC 39.7550 through 39.7575 apply.

MCC 39.7550 Purpose

The purposes of this subpart of MCC Chapter 39 are to:

(A) Minimize visual impacts of towers through careful design, siting and vegetative screening.

(B) Avoid potential damage to adjacent properties from tower failure and falling ice, through engineering and careful siting of tower structures.

(C) Lessen traffic impacts on surrounding residential areas.

(D) Ensure that the amount of non-ionizing electromagnetic radiation emitted by antennas does not exceed the amount at which human health has been found to be affected and is the minimum necessary to provide adequate access to the area's broadcasters by requiring compliance with stated emission standards and required separation standards.

Response: This purpose statement does not operate as a directly applicable approval criterion. Instead, it states the purpose to be served by the criteria below. Subsection (A) is implemented through MCC 39.7565(A), (B), (C), and (I), Subsection (B) is implemented through MCC 39.7565(I), Subsection (C) is implemented through MCC 39.7565 (D), and Subsection (D) is implemented through MCC 39.7565(F) below.

MCC 39.7560 Application Requirements

An application for approval of a Community Service designation for a radio or television transmission tower shall contain at least the following information before it is complete:

Response: The Water Bureau worked with the City of Portland Bureau of Technology Services (BTS) and communication and data experts to propose a communications tower, antenna, and accessory equipment that meet both the design objectives for the project and MCC requirements. As documented below, the communications tower (with equipment) is sized appropriately, considers areal context, is designed in accordance with industry best practices (Telecommunications Industry Association [TIA]-222-G), minimizes visual and adverse effects, and the plans are stamped by a licensed Professional Engineer. The following subsections demonstrate that the application contains at least the enumerated submittal requirements.

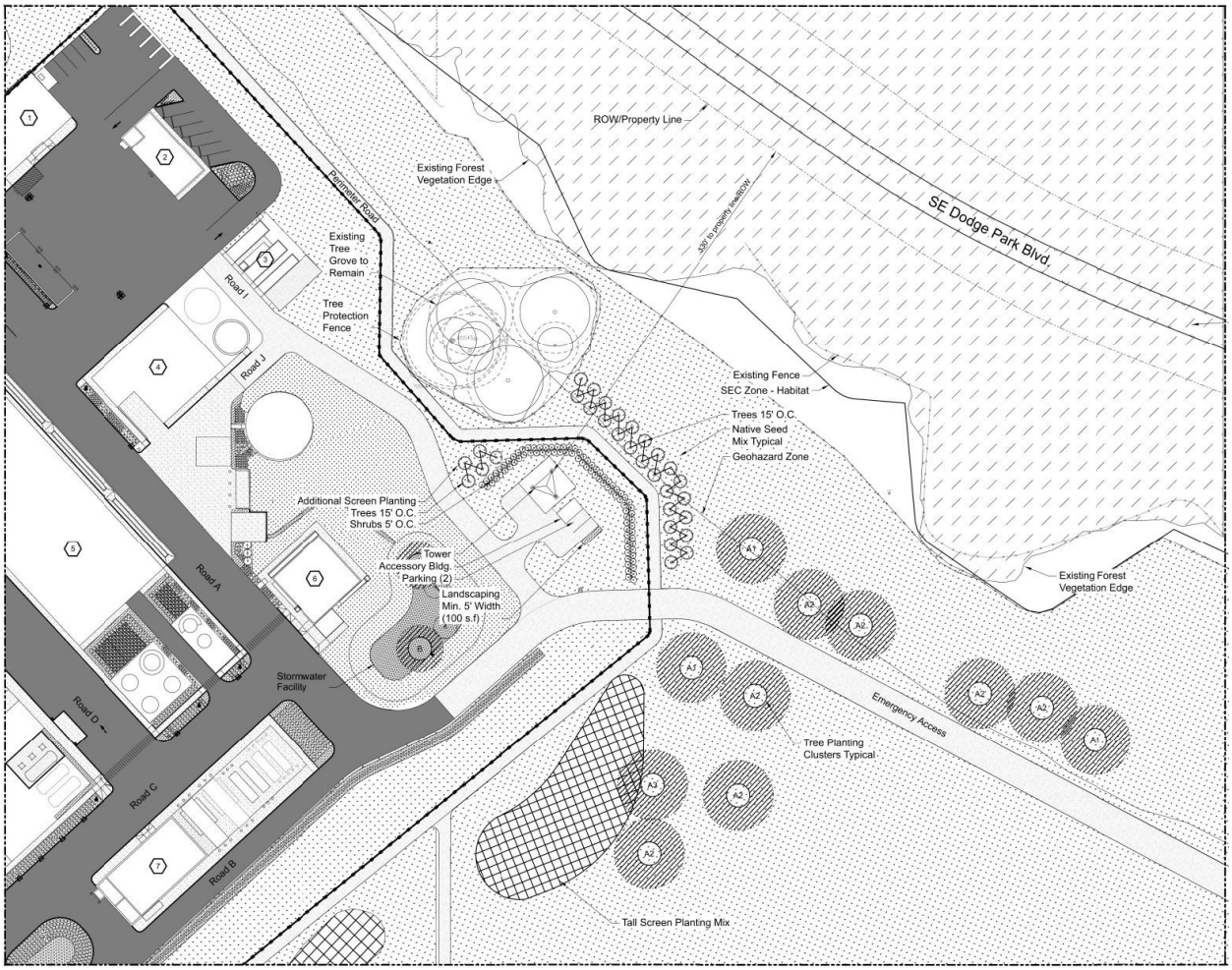

Figure 2. Communication Tower Site Plan with Landscaping

(A) Site plan or plans to scale specifying the location of towers(s), guy anchors (if any), transmission building and/or other accessory uses, access, parking, fences, landscaped areas, and adjacent land uses. Such plan shall also demonstrate compliance with MCC 39.7565 (I) and (J).

Response: Sheet LU-402 in Appendix A.1a provides a site plan for the tower and transmission building, as well as access, parking, and landscaped areas. The site plans are drawn to scale and specify the location of the tower, the location of the transmission building at the base of the tower, access to the tower, the delineated parking area, landscaped area and all adjacent land uses. The site plans illustrate the site size and tower setbacks from property lines and other elements as required by Subsection (I) and demonstrates that no guy setbacks are required for this proposal under Subsection (J). Each of these site elements is further addressed below under the approval criteria related to that requirement.

(B) Landscape plan to the scale indicating size, spacing and type of plantings required in 39.7565 (B).

Response: A scaled Landscape Plan is provided in Appendix A.1a (Sheet LU-402). The Landscape Plan demonstrates that the tower is 200-feet tall or less, and therefore at least a 25-foot-wide landscape buffer area commences at the property line. In this case, the buffer is 330-feet wide, far in excess of the 25-foot buffer otherwise required by the code. The Landscape Plan shows at least one row of evergreen shrubs planted not more than 5 feet apart and are of the variety that will allow for a continuous hedge of at least 5 feet within 2 years of planting. All of the requirements are shown on the Landscape Plan and compliance with each of the landscape criteria are discussed below under each relevant approval standard.

(C) Report from a professional engineer licensed in the State of Oregon, documenting the following:

(1) Tower height and design, including technical, engineering, economic, and other pertinent factors governing selection of the proposed design. A cross-section of the tower structure shall be included.

Response: The required design report prepared and stamped by an Oregon professional engineer, Jeffrey E. Grassman, PE, is provided in Appendix M.1. The report provides the technical, engineering, economic, and other pertinent factors governing selection of the proposed design. General tower and foundation design components are depicted in Appendix M.2 and M.3, respectively. Appendix M.2 includes a cross section of the tower structure. The tower is designed to eliminate the need for guy wires, which effectively reduces the footprint of the tower within the project and reduces its visibility. As shown in Appendix M.3, the entire tower slab foundation is only 30 feet by 30 feet.

Appendix M.4 contains the tower design calculations, including the data and calculations for wind, ice and seismic tolerance with detailed tower point load data. The tower has been designed to meet all industry standards for performance and safety. The communications tower will be located in the northeast portion of the facility, approximately 235 feet from the top of the Sandy River valley slope and approximately 330 feet from the east property line. As indicated in the Microwave Path Survey Interpretation Memo (Appendix M.9a) BTS recommended that the microwave system height should be a minimum of 165 feet in height to allow for 20 years of tree growth without interfering with the tower communications and the tower itself should be 180 feet to allow for installation and maintenance of the microwave system. This is based on Aviat Networks' Microwave Path Survey (Appendix M.9b). The 180-foot tower is the minimum needed for the microwave dish to be above the existing tree line and have line-of-sight with Lookout Point tower as well as for SCADA communications to have line-of-sight with repeaters at Mt Scott, Council Crest, Prune Hill, and Willalatin.

In accordance with MCC 39.7565, the tower will be painted green from base to the treeline and will have a galvanized (silver-toned) finish above treeline. A 12- by 20-foot accessory communications equipment building is proposed immediately southeast and adjacent to the proposed tower.

(2) Total anticipated capacity of the structure, including number and types of antennas which can be accommodated.

Response: BTS performed an assessment of antenna type, quantity, and mounting height which was provided to Valmont Industries for inclusion in their load scenario evaluations to verify that the proposed tower has sufficient capacity as calculations shown in Appendix M.4. The number and types of antennas (provided by BTS) are listed in Appendix M.4 pages 11-12.

(3) Evidence of structural integrity of the tower structure as required by the Building Official.

Response: The applicant commissioned extensive study of the structural integrity of the tower structure as part of the project Panning and review. Comprehensive structural performance calculations of the proposed tower are provided in Appendix M.4 for relevant loading scenarios. TIA-222-G rigorously controls design of these kind of towers. As part of the required engineering study the loading conditions account for factors, including but not limited to, the respective mounted height, tower leg, weight, and weight with ice on the antennas. As demonstrated in Appendix M.4, the tower will maintain structural integrity based on the specific lattice design and accounting for all anticipated conditions including the mounted height of the antennas, wind shear, seismic condition, and weight with and without ice. The structural study included an evaluation of the ladder mounting, foundation design, and location within the filtration facility itself. Based on these comprehensive and detailed calculations, which can be reviewed and scrutinized by the Building Official, the report provides compelling evidence of the structural integrity of the tower consistent with TIA-222-G.

(4) Failure characteristics of the tower and demonstration that site and setbacks are of adequate size to contain debris.

Response: Appendix M.5 provides an analysis of failure characteristics.

In the rare event that a tower member force has exceeded all rational design criteria and has become overloaded, the typical consequence of the overloading is “local buckling” where a relatively small portion of the member distorts and “kinks” the steel. If this occurs, much of the loading is redistributed to members with unused reserve capacity. The result is a localized distortion, but rarely a complete tower collapse. Towers are made of many members. As stated in Appendix M.5, load redistribution enables the tower to sustain loads even in excess of extreme magnitudes used in tower design.

If a tower did fail, it is rare for a tower to fall in a radius larger than half its height, and in most cases, it will collapse in a small confined area as it comes down upon itself. In Valmont’s experience with over 60 years of engineering and fabricating thousands of towers, like the tower proposed here, they have not had one tower fail due to overloading (even in the extreme cases that wind speeds have exceeded design values). This project will use the latest standards, wind speed information, and sophisticated analytical tools to ensure that the structural integrity of this tower design is maintained. Regardless, Appendix M.5 addresses product failure characteristics. Based on Appendix M.5, in the rare event of tower failure, it would be expected for the proposed tower to fail within 90 feet of its base. The communications tower will be located in the northeast portion of the filtration facility site, approximately 235 feet from the top of the Sandy River valley slope and approximately 330 feet from the east property line. Thus, even in the rare event of tower failure, by any objective

measurement, any debris would be contained within the site, including any tower debris. These distances are illustrated on Figure 2.

> *(5) Ice hazards and mitigation measures which have been employed, including increased setbacks and/or deicing equipment.*

Response: The proposed tower design accounts for icing. In Appendix M.4, the engineering team evaluated three loading scenarios and included an ice and wind scenario, with 1.5 inches of ice on the tower. Scenario calculations also included ice and weight data for antenna, standoff brackets, and ladders. Appendix M.4 contains stamped design, loading scenarios, and calculations for each of these scenarios. As noted above, the tower will be located approximately 330 feet from the closest property line. In a severe combination of wind gust and ice, it is anticipated that ice would not fall farther than 100-130 feet from the tower (Appendix M.10). Thus, if there is any circumstance in which ice debris fell from the tower, it would fall well within the property lines. Given this circumstance, the applicant will restrict access to the facility at all times and certainly during any ice storm event where ice could accumulate on the tower. With controlled access and safety operating procedures for access and restricted areas during an ice event, along with the distance to the property line, ice hazards will be properly mitigated.

> *(D) Statements from the F.A.A, O.S.A.D., and F.C.C., that the standards of MCC 39.7565 (G) are met or the required good faith, timely effort it achieve such responses.*

Response: The F.A.A. statement is provided in Appendix M.6 and concludes: "This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation." The O.S.A.D. statement is provided in Appendix M.7 and concludes: "The Oregon Department of Aviation (ODAV) has conducted an aeronautical study of this proposed construction and has determined that notice to the FAA is not required. The structure does not exceed FAR Part 77.9 (a, b or c) or Obstruction Standards of OAR 738-70-0100." The F.C.C. correspondence is provided in Appendix M.8. In the case of the F.C.C., Appendix M.8 demonstrates that the standards of MCC 39.7565 (G) are satisfied for the proposed tower design. M.8 states "Radio Station Authorization" and contains a record of the public information contained in the F.C.C.'s licensing database for the point-to-point microwave system. The F.C.C. "Radio Station Authorization" does not contain any conditions but for the requirement that the applicant continue to operate under the terms of the license.

> *(E) Written authorization from adjoining property owners, if needed, under MCC 39.7565 (J).*

***Response**:* The tower footprint is completely contained within the public property boundaries and is located approximately 330 feet from the closest property line. No guy wires are proposed; therefore, adjoining property owner permission is not needed.

> *(F) Responses to the applicable Comprehensive Plan Policies.*

Response: Applicable Comprehensive Plan Policies are addressed in the response to MCC 39.7565(E), below and are therefore incorporated herein by reference, instead of restating.

MCC 39.7565 Approval Criteria for New Transmission Towers

New transmission towers base zone permitted under MCC 39.7520 (A) (8) (a) or (b) may be allowed, based on findings by the approval authority that the following criteria are met.

(A) The site is of a size and shape sufficient to provide the following setbacks:

(1) For a tower located on a lot abutting an urban residential base zone or a public property or street, except a building-mounted tower, the site size standards of MCC 39.7565 (I) and (J) are met as to those portions of the property abutting the residential or public uses.

(2) For all other towers, the site shall be of sufficient size to provide the setback required in the base zone between the base of the tower, accessory structures and uses, and guy anchors, if any, to all abutting property lines.

Response: As shown in Figure 1, the 95-acre filtration facility site abuts two public streets, Dodge Park Boulevard and Carpenter Lane. The communications tower is located on the north-central portion of the site, set back approximately 330 feet from the nearest property line at Dodge Park Boulevard, and 900 feet from the Carpenter Lane ROW. The site size standards of MCC 39.7565 (I) and (J) are further addressed below under each of those criteria and those responses demonstrate that these criteria are satisfied and exceeded. As shown in Figure 1, the communications tower will be located in the north-central portion of the 95-acre site, more than 200 feet from the top of the Sandy River valley slope, approximately 330 feet from the nearest property line (at Dodge Park Boulevard), and 900 feet from the Carpenter Lane ROW.

Substantial buffers with vegetation (forest), topography (steep slopes), and large setbacks are proposed, exceeding the standards of MCC 39.7565 (B). Buffers to adjoining residential property exceed 1,000 feet and will preserve the privacy of the filtration facility site's neighbors.

Based on information provided in Appendix M.5, and addressed above, in the rare event of tower failure, it would be expected for the proposed tower to fail within 90 feet of its base. This is substantially less than the 330-foot distance from the proposed tower location to nearest property corner to the north at the Dodge Park Boulevard ROW. The tower setback also far exceeds 20 percent of the height of the tower. The setback is approximately 330 feet and the tower is 180 feet tall (183 percent of tower height). The tower setback also far exceeds the MUA-20 rear yard setback of 30 feet.

(B) The required setbacks shall be improved to meet the following landscaping standards to the extent possible within the area provided:

(1) Landscaping at the perimeter of the property which abuts streets, residences, public parks or areas with access to the general public other than the owner of such adjoining property. Such landscaping plan shall demonstrate the following:

(a) For towers 200 feet tall or less, a buffer area no less than 25 feet wide shall commence at the property line. At least one row of evergreen shrubs shall be spaced not more than five feet apart. Materials should be of a variety which can be expected to grow to form a continuous hedge at least five feet in height within two years of planting. At least one row of evergreen trees or shrubs, not less than four feet height at the time of planting, and spaced not more than 15 feet apart, also shall be provided. Trees and shrubs in the vicinity of guy wires

> *shall be of a kind that would not exceed 20 feet in height or would not affect the stability of the guys, should they be uprooted, and shall not obscure visibility of the anchor from the transmission building or security facilities and staff.*

Response: The tower is 180 feet in height, so this standard applies. A minimum buffer area of 330 feet is provided between the tower and the nearest property line at Dodge Park Boulevard. The tower is 200-feet tall or less, and therefore at least a 25-foot-wide landscape buffer area commences at the property line. In this case, the buffer is 330-feet wide, far in excess of the 25-foot buffer otherwise required by the code. The Landscape Plan shows at least one row of evergreen shrubs planted not more than five feet apart and of a variety that will allow for a continuous hedge of at least five feet within two years of planting. A second row of evergreen trees planted at no less than four feet in height and spaced not more than 15 feet part are also shown on the Landscape Plan in compliance with this criterion. Because the proposed tower does not rely on or require guy wires, the balance of this standard is not applicable to this proposal.

> *(b) For towers more than 200 feet tall, a buffer area not less than 40 feet wide shall be provided at the property line with at least one row of evergreen shrubs spaced not more than five feet apart which will grow to form a continuous hedge at least five feet in height within two years of planting; one row of deciduous trees, not less than 1 1/2 inch caliper measured three feet from the ground at the time of planting, and spaced not more than 20 feet apart; and at least one row of evergreen trees, not less than four feet at the time of planting, and spaced not more than 15 feet apart. Trees and shrubs in the vicinity of guy wires shall be of a kind that would not exceed 20 feet in height or would not affect the stability of the guys, should they be uprooted, and shall not obscure visibility of the anchor from the transmission building or security facilities and staff.*
>
> *(c) In lieu of these standards, the approval authority may allow use of an alternate detailed plan and specifications for landscape and screening, including plantings, fences, walls and other features designed to screen and buffer towers and accessory uses. The plan shall accomplish the same degree of screening achieved in (a) and (b) above, except as lesser requirements are desirable for adequate visibility for security purposes and for continued operation of existing bona fide agricultural or forest uses, including but not limited to produce farms, nurseries, and tree farms.*

Response: The communications tower will be less than 200 feet tall; therefore, subsection (b) does not apply. The site plan (Appendix A.1a, sheet LU-402) shows that the standards of subsection (a) are met; therefore, subsection (c) does not apply.

> *(C) The applicant shall demonstrate that the tower can be expected to have the least visual impact on the environment, taking into consideration technical, engineering, economic and other pertinent factors. Towers clustered at the same site shall be of similar height and design, whenever possible. Towers shall be painted and lighted as follows:*

Response: The filtration facility has been designed to require only a singular communications tower. The singular tower has been engineered and designed to form a slender lattice design that requires no expansive guy wires. As thoroughly discussed below in the response to the DR criteria, the following factors result in the least visual impact on the environment:

- The lattice design offers a transparent structure, rather than an opaque exterior, allowing visual access through the tower in all directions to both the new landscaped buffer within the tower setback as well as the densely wooded existing forested environment to the northeast border as shown in Figures 3 through 6.
- The tower presents a tailored design and footprint with no guy wires, representing the minimum size and height necessary to serve its essential communications function.
- The tower has been relocated on the site, based on ongoing feedback from the Site Advisory Group, to optimize the forest screening and minimize visual impacts from the surrounding residences. Buildings that have a visual relationship with the tower are over 1,000 feet distant to the northwest and southeast and are buffered by existing vegetation. Other locations for tower placement were all more exposed than the proposed location and did not optimize the ability to use the existing dense forested environment to further screen the tower.
- The tower will be painted green below the treeline and a silver shade above the treeline to blend in with the forest and sky.
- Figure 2 demonstrates that the placement of the tower is as close as possible to the dense forest to the northeast of the facility behind an established grove of trees while also avoiding the Geologic Hazard Overlay.
- The proposed location will still allow for the tower to remain within line of sight of the Administrative Building for direct observation and within the communications line with the Bull Run communications tower.

For these reasons, together with the illustrative Figures presented under the DR response, the tower will have the least visual impact on the environment compared to other tower designs or other locations on the facility site.

> *(1) Towers 200 feet or less in height shall have a galvanized finish or be painted silver. If there is heavy vegetation in the immediate area, such towers shall be painted green from base to treeline, with the remainder painted silver or given a galvanized finish.*
>
> *(2) Towers more than 200 feet in height shall be painted in accordance with regulations of the Oregon State Aeronautics Division.*

Response: The communications tower is less than 200 feet tall. As shown on Figure 11, the upper portion of the tower will be painted with a silver tone or galvanized finish to blend with the sky above the treeline and below treeline will be painted dark green to effectively blend with the existing dense forest environment as well as the new landscape plantings within the buffer area.

> *(3) Towers shall be illuminated as required by the Oregon State Aeronautics Division. However, no lighting shall be incorporated if not required by the Aeronautics Division or other responsible agency.*

Response: No tower light is proposed because no responsible agency (including the Oregon State Aeronautics Division) requires lighting (Appendix M.7).

(4) Towers shall be the minimum height necessary to provide parity with existing similar tower supported antenna, and shall be freestanding where the negative visual effect is less than would be created by use of a guyed tower.

Response: The proposed tower is freestanding. As stated above, the tower is the minimum size and height necessary to support its essential communication function. The freestanding tower has many benefits including its transparent lattice structure, the lack of guy wires which would effectively expand its footprint, its height under 200 feet, and because of this engineering, its ability to be tucked up close to the northeast dense forested area on the site. Also as discussed above, the Microwave Path Survey Interpretation Memo (Appendix M.9a) concluded that the 180-foot height is the minimum height necessary to meet design objectives. In this case, the height is necessary to provide a clear line of sight in parity to existing towers for reliable communication contact, along with accommodation for planned tree growth in the area over the ensuing 20-year period, and sufficient area for antenna equipment and installation. All of these essential design objectives have been accommodated in the minimum tower height of 180 feet without guy wires.

(D) A minimum of two parking spaces shall be provided on each site; an additional parking space for each two employees shall be provided at facilities which require on-site personnel, provided additional parking may be required in accordance with MCC 39.6500 to 39.6600 if the site serves multiple purposes.

Response: As shown on the communication tower site plan in Appendix A.1a (Sheet LU-402), two parking spaces are provided. Parking for the filtration facility itself is addressed in Section 1.A of this narrative.

(E) The applicable policies of the Comprehensive Plan are met.

Response: Based on the Hearings Officer decision (Case File #T3-2017-7661 provided in Appendix O.3) for the communication tower at the LHTF, the following policies are applicable:

11.12 A water supply system for new development shall be by either of the following methods: 1. Connection to a public water system having adequate capacity to serve the development and all other system customers. 2. A private water system that produces safe drinking water with sufficient volume and pressure to meet applicable Building Code and Fire Protection Code.

Response: As documented in Appendix L.9., the Water Bureau will self-provide public water service with flows adequate for filtration facility operations, including the communications tower, as well as the nearly one million people the Water Bureau serves. Therefore, this Comprehensive Plan policy is satisfied.

11.13 Wastewater disposal for new development shall be by any of the following methods:

1. Connection to a public sewer system having adequate capacity to serve the development and all other system customers.

2. A private system that meets Oregon Department of Environmental Quality regulations.

Response: As documented in Appendix L.8, the site has been approved for a septic tank and drainfield system meeting all Oregon Department of Environmental Quality (DEQ) requirements. Therefore, this Comprehensive Plan policy is satisfied.

11.17 As appropriate, include school districts, police, fire protection, and emergency response service providers in the land use process by requiring review of land use applications from these agencies regarding the agency's ability to provide the acceptable level of service with respect to the land use proposal.

Response: The site is within the Oregon Trail School District. However, the filtration facility communications tower will not increase demand for school facilities. Accordingly, service provider forms for schools were not required by County staff in the pre-application conference.

Police and emergency response service is provided by the Multnomah County Sheriff's Office. Service provider forms for the County Sheriff's Office are provided in Appendix L.1. The Sheriff's Office has responded that it has the capacity to provide acceptable levels of public safety services to the site. As Appendix L.1 states: "The level of police/sheriff service available to serve the proposed project is adequate."

Gresham Fire provided the Fire Service Agency Review form in Appendix L.10.b. The Fire Service Agency Review form confirms that the project is inside service boundaries. Gresham Fire expressed no concerns about its ability to provide the acceptable level of service for the project.

(F) The NIER standards of MCC 39.7575 are met.

Response: As documented in Appendix M.11, prepared by E. Robin Smyth, PE, the NIER standards of MCC 39.7575 are met. The expert telecommunications report concludes that the predicted power density level from each individual transmitter is less than 5 percent of the maximum FCC exposures; the combined NIER levels from all transmitters does not exceed the allowed MPE levels for either the general population or the occupational population within and outside the property line of the site; and the operation of the communications tower meets and exceeds the non-ionizing electromagnetic emission standards as established by the FCC.

(G) The following agency coordination standards are met:

(1) A written statement provided by the applicant from the appropriate official in the Federal Aviation Administration that the application has not been found to be a hazard to air navigation under Part 77, Federal Aviation Regulations, or a statement that no compliance with Part 77 is required;

(2) A written statement provided by the applicant from the appropriate official in the Oregon State Aeronautics Division that the application has been found to comply with the applicable regulations of the Division, or a statement that no such compliance is required; and,

(3) A written statement provided by the applicant from the appropriate official in the Federal Communications Commission that the application complies with the regulations of the Commission or a statement that no such compliance is necessary.

(4) The statements in (1) through (3) may be waived when the applicant demonstrates that a good faith, timely effort was made to obtain such responses but that no such response was forthcoming, provided the applicant conveys any response received; and further provided any subsequent response that is received is conveyed to the approval authority as soon as possible.

Response: The F.A.A. statement is provided in Appendix M.6 and concludes: "This aeronautical study revealed that the structure does not exceed obstruction standards and would not be a hazard to air navigation." The O.S.A.D. statement is provided in Appendix M.7 and concludes: "The Oregon Department of Aviation (ODAV) has conducted an aeronautical study of this proposed construction and has determined that notice to the F.A.A. is not required. The structure does not exceed FAR Part 77.9 (a, b, or c) or Obstruction Standards of OAR 738-70-0100." The F.C.C. correspondence is provided in Appendix M.8. In the case of the F.C.C., Appendix M.8 demonstrates that the standards of MCC 39.7565 (G) are satisfied for the proposed tower design. M.8 states "Radio Station Authorization" and contains a record of the public information contained in the F.C.C.'s licensing database for the point-to-point microwave system. The F.C.C. "Radio Station Authorization" does not contain any conditions but for the requirement that the applicant continue to operate under the terms of the license.

(H) For a proposed tower in the EFU, CFU and MUA-20 base zones, the following restrictions on accessory uses shall be met:

(1) Accessory uses shall include only such buildings and facilities necessary for transmission function and satellite ground stations associated with them, but shall not include broadcast studios, offices, vehicle storage areas, nor other similar uses not necessary for the transmission function.

(2) Accessory uses may include studio facilities for emergency broadcast purposes or for other special, limited purposes found by the approval authority not to create significant additional impacts nor to require construction of additional buildings or facilities exceeding 25 percent of the floor area of other permitted buildings.

Response: As shown in Figure 2, only one accessory building is proposed, immediately southeast and adjacent to the proposed tower to house communications equipment necessary for the tower's transmission function and associated satellite ground station. The proposed building will be 12 feet by 20 feet. No other accessory uses are proposed or needed for the essential communication transmission function. In no case does the 240 square foot minimal accessory footprint exceed 25 percent of the floor area of the other permitted buildings.

(I) Site size and tower setbacks:

(1) The site shall be of a size and shape sufficient to provide an adequate setback from the base of the tower to any property line abutting an urban residential base zone, public property, or public street. Such setback shall be sufficient to:

(a) Provide for an adequate vegetative, topographic or other buffer, as provided in MCC 39.7565 (C) and (B),

(b) Preserve the privacy of adjoining residential property,

(c) Protect adjoining property from the potential impact of tower failure and ice falling from the tower by being large enough to accommodate such failure and ice on the site, based on the engineer's analysis required in MCC 39.7560 (C) (4) and (5), and

Response: Similar standards are addressed above under the visual impact standard and are incorporated herein by reference as well as the design response below which details the location and screening of the tower from surrounding land uses. As shown in Figure 1, the communications tower will be located in the north-central portion of the 95-acre site, more than 200 feet from the top of the Sandy River valley slope, 330 feet from the nearest property line (at Dodge Park Boulevard), and 900 feet from the Carpenter Lane ROW.

Substantial buffers with vegetative (forest), topographic (steep slopes), and large setbacks are proposed, exceeding the standards of MCC 39.7565 (C) and (B). Buffers to adjoining residential property exceed 1,000 feet[1] and will preserve the privacy of the site's neighbors.

Based on information provided in Appendix M.5, in the rare event of tower failure, it would be expected for the proposed tower to fail within 90 feet of its base. This is substantially less than the 330-foot distance from the proposed tower location to nearest property corner to the north at the Dodge Park Boulevard ROW. The proposed tower design accounts for icing. In Appendix M.10, the engineering team evaluated three loading scenarios and included an ice and wind scenario, with 1.5 inches of ice on the tower. Scenario calculations also included ice and weight data for antenna, standoff brackets, and ladders. Appendix M.4 contains stamped design, loading scenarios, and calculations from each of these scenarios. As above, the tower will be located at least 330 feet from the closest property line. Based on the wind speed and ice thickness study, in a combination of wind and ice, it is not expected that ice would fall farther than 100-130 feet from the tower (Appendix M.10). Thus, if there is any circumstance in which ice debris fell from the tower, it would fall well within the property lines. Given this circumstance, the applicant will restrict access to the facility at all times and certainly during any ice storm event where ice could accumulate on the tower. By controlling access and implementing standard operating procedures for access during an ice event, any ice fall hazard risk is minimized.

(d) Protect the public from NIER in excess of the standard of MCC 39.7575 (A).

Response: The tower will be well below the NIER standards of MCC 39.7575(A) as documented in Appendix M.11. As stated above, the expert telecommunications report concludes that the predicted power density level from each individual transmitter is less than 5 percent of the maximum FCC exposures; the combined NIER levels from all transmitters does not exceed the allowed MPE levels for either the general population or the occupational population within and outside the property line of the site; and the operation of the communications tower meets and exceeds the non-ionizing electromagnetic emission standards as established by the FCC.

(2) A site is presumed to be of sufficient size when it:

(a) Meets the requirements of (1) (c) and (d) above,

(b) Provides a setback equal to 20 percent of the height of the tower to any property line abutting an urban residential base zone, public property, or public street, and

(c) Provides a setback equal to or exceeding the rear yard setback required for the adjoining property where the adjoining property is not in an urban residential base zone nor a public property or a public street.

[1] Residential properties to the north of Dodge Park Boulevard are fully screened from the site and tower by dense forest and steep slopes.

Response: The site meets the presumptive standards for sufficient size because:

(a) Standards (1) (c) and (d) are met, as documented above.

(b) The tower setback far exceeds 20 percent of the height of the tower. The setback is approximately 330 feet and the tower is 180 feet tall (183 percent of tower height).

(c) The tower setback far exceeds the MUA-20 rear yard setback of 30 feet.

(3) Placement of more than one tower on a lot shall be permitted, provided all setback, design and landscape requirements are met as to each tower. Structures may be located as close to each other as technically feasible, provided tower failure characteristics of the towers on the site described in MCC 36.6110 (C) (4) will not lead to multiple failures in the event that one fails.

Response: Only one communication tower is proposed at this site.

(4) Structures and uses associated with the transmission use other than the transmission tower shall be located to meet the setbacks required in MCC 39.7525.

Response: The accessory communications equipment building is proposed immediately adjacent to the tower. It too will be at least 350 feet from the nearest property line, exceeding the setback standards described under MCC 39.7525.

(J) Guy setbacks

Response: No guy wires are proposed; these standards therefore do not apply to this application.

MCC 39.7575 Radiation Standards

Non-ionizing electromagnetic radiation standards.

(A) No source of non-ionizing electromagnetic radiation shall hereinafter be operating, which causes the general population to be exposed to radiation levels exceeding the mean squared electric (E2) or mean squared magnetic (H2) field strengths, or their equivalent plan wave free space power density, as specified in Table 1.

Response: The communications tower is a facility operating at frequencies between 300 MHz and 1500 MHz, and at 11,000 MHz for a microwave link. Therefore per Table 1, antennas 1 through 7 require a power density of below f/1500. Application Appendix M.11 demonstrates that the equivalent power density of approximately .21mW/cm^2 (as shown in Figure 4) is below 960MHz/1500Mhz and in compliance with this standard.

The microwave link operates at a frequency of 11,000 MHz. Therefore, per Table 1, it requires a power density of below 1. Appendix M.11 demonstrates that the equivalent power density of approximately .21mW/cm^2 (as shown in Figure 4) is below 1 and in compliance with this standard.

The highest NIER level which is located 374 feet or 114 meters from the communication tower is only 33 percent of the allowed MPE for the general population and less than 6.6 percent of the Occupational Population limit.