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3.5 Communications Interference

This section identifies and evaluates issues related to Communications Interference in the context of the Project and alternatives. It includes the physical and regulatory setting, the criteria used to evaluate the significance of potential impacts, the methods used in evaluating these impacts, and the results of the impact assessment.

Communications Interference is not a topic typically addressed in the County's CEQA analyses. However, the County has elected to address potential interference with communications as a potential impact on the physical environmental impact in this EIR in light of the critical function of communications in emergency response, which is a public safety topic that is addressed under CEQA, and because interference with cell, radio, television, and other communications could adversely affect human health and the physical environment if emergency response communications were prevented, interrupted or delayed. Also, as summarized below, the County received scoping comments expressing concern about the potential for the Project to cause interference with communications (see **Appendix J**, *Scoping Report*). The analysis in this section addresses those comments.

Frontier Communications provided initial input for the County's environmental review process shortly after the CUP application was filed for the Project. In it, the company confirmed that it has existing facilities along State Route (SR) 299 (Frontier Communications, undated). Later, in response to the issuance of notice of intention to prepare this Draft EIR, the County received scoping input about the potential for Project components (e.g., wind turbines or meteorological towers) to cause communications interference that adversely affects residents' and others' ability to coordinate with emergency service providers via cell phone, 2-way radio, landlines, or the internet. One comment also asked about potential interference with television reception. Concerns were raised specifically regarding potential interference with the communications infrastructure and communications needs of the Shasta Area Safety Communications Agency (SHASCOM), California Highway Patrol (CHP), air ambulance service providers such as PHI and REACH, aviation companies that use the flight path over the proposed site, and Valley Industrial Communications, which repairs and handles repeaters and radio problems for public safety entities such as the Sherriff's Office and SHASCOM. All scoping input received, including regarding communications interference, is provided in Section 4.1 of the Scoping Report (Appendix J).

This section relies in part on the information provided by the communications interference engineering report prepared on behalf of the County for this Project by Evans Engineering Solutions. A copy of the report is provided in **Appendix D**, *Communications Interference*. The report describes the results of a study to determine the locations of FCC-licensed microwave and fixed station radio frequency facilities that may be adversely impacted as a result of the construction of wind turbines at the Project Site and an analysis to determine whether interference is likely to occur.

3.5.1 Setting

3.5.1.1 Study Area

The study area relevant to the analysis of communications interference includes the potential impact zone for Project interference on communications signals. The study areas and database search distances relevant to different types of communications signals are summarized in **Table 3.5-1**, and their relevance is explained in more detail in Section 3.5.2.2, *Environmental Setting*.

TABLE 3.5-1
STUDY AREAS AND DATABASE SEARCH DISTANCES FOR RELEVANT COMMUNICATIONS TYPES

Communications Type	Study Area and/or Database Search Distance	Rationale for Study Area/Search Distance
Land mobile/public safety radio transmitter stations	About 1,400 feet	Wind-turbine-caused interference at land mobile transmitter stations typically occurs only within 425 meters or about 1,400 feet of a turbine site.
Satellite earth stations	65 miles	Impact potential depends on satellite arc; 65 miles encompasses any stations that could have impacts.
AM broadcast facilities	1.8 miles	Large metallic structures such as wind turbines can adversely affect the transmitted signals of AM broadcast stations up to 3 kilometers (1.8 miles) away.
TV broadcast facilities	3 miles	About 10 percent of receiver locations can be affected to some extent within 3 miles of a large turbine when the turbine is between the TV station and the receiver.
Aircraft navigation	10 miles	Interference with aircraft navigational communications is not anticipated from structures more than 10 miles from a navigational radio beacon.
Microwave and cellular communications	Study area is a modeled zone described in Section 3.5.3.1 Search radius for microwave towers is 2 miles	The “first Fresnel zone” of microwave signal paths is the zone in which microwave transmissions travel from the point of origin to a receiver. A search radius of 2 miles from the Project Site encompasses all towers within any of the modeled first Fresnel zones.

SOURCE: Appendix D; Angulo et al., 2014.

3.5.1.2 Environmental Setting

Radio and Television Communication

Four types of radio and television communications facilities are considered in this section: land mobile/public safety radio transmitter stations (“land mobile stations”), satellite earth stations, AM broadcast stations, and television broadcast facilities.

Although the engineering report used a database search area of 2 miles, it indicates that wind-turbine-caused interference at land mobile transmitter stations typically occurs only within

425 meters or about 1,400 feet of a turbine site; this distance is referred to as the "worst-case recommended setback" from land mobile stations. The closest station to a proposed turbine location is 592 meters (about 1,950 feet) from Turbine M08 (Appendix D). The known locations of land mobile stations near the Project Site are outside the area of potential impact.

The report also identified one FCC-authorized satellite earth station whose range extends across the Project Site. It is located about 37 kilometers (23 miles) from the nearest proposed turbine location (B03), and its signal would be clear of the turbine's blades by over a mile in vertical distance, and would therefore be outside of the three-dimensional impact area for the Project.

Large metallic structures such as wind turbines can adversely affect the transmitted signals of AM broadcast stations up to 3 kilometers (1.8 miles) away. There are no AM broadcast facilities within 1.8 miles of the Project Site; therefore, no such facilities would be within the impact area for the Project (Appendix D). Because none of these facility types would be close enough to experience impacts from the Project, land mobile stations, satellite earth stations, and AM broadcast facilities are not discussed further.

Finally, television broadcast signals can be interrupted when the direct path from a broadcast station to a television viewer's residence or other receiver is reflected by turbine blades, and the engineering report indicates that typically, approximately 10 percent of the receiver locations could be affected to some extent within 3 miles of a large turbine when the turbine is between the TV station and the receiver (Appendix D). Up to 22 television broadcast stations currently are licensed to send broadcast signals through or immediately adjacent to the Project Site,[1] and these stations serve customers in an area of approximately 215 square miles surrounding the Project Site.

Aircraft Navigational Systems

There are three public airports in Shasta County: the Redding Municipal Airport, Benton Airpark, and Fall River Mills Airport. The nearest airport to the Project Site, the Fall River Mills Airport, is located approximately 20 miles northeast of the Project Site. There are no nearby airports operated by the U.S. Military.

The Fall River Mills Airport and Benton Airpark have Common Traffic Advisory Frequency (CTAF) radio communication capability, but no tower and aircraft instrumentation systems (AirNav.com, 2020a, 2020b). Radio transmissions are addressed above, and as noted, known radio signals are located outside the potential impact area of the Project and are not addressed further.

The Redding Municipal Airport has a Very High Frequency Omni-Directional Range (VOR) aircraft navigational radio system that supports instrumented aviation and is maintained by the Federal Aviation Administration (FAA) (AirNav.com, 2020c). Although interference with VOR communications is not anticipated from structures more than 10 miles (15 kilometers) from a

[1] Up to 13 of these 22 stations are currently off the air and target dates for return to operation are unknown (Appendix D).

beacon (Angulo et al., 2014) and the Redding Municipal Airport is over 35 miles from the Project Site, aircraft navigational systems are addressed in the impact analysis because the Applicant would be required to file a notice with the FAA to determine potential effects on navigation signal reception as explained in Section 3.5.1.3, regardless of this distance.

Cellular Phone and Microwave Communication

Microwaves are a type of electromagnetic wave used to carry information such as radio, cellular phone, and digital communications at high speeds. Microwaves travel along direct line-of-sight paths and their transmission requires the use of multiple towers to receive, amplify, and re-transmit signals over long distances. The engineering report identified 72 licensed microwave paths within 2 miles of the Project Site, many of which cross the Project Site near the proposed locations of turbines. Licensees include but are not limited to Pacific Gas and Electric Company (PG&E), the State of California, Citizens Telecom Company of California, Southern Oregon University, New Cingular Wireless, Transmission Agency of Northern California, KCVU-TV, and T-Mobile. Microwave transmissions can be obstructed if structures such as wind turbines or buildings interrupt these line-of-sight paths or cause reflections of signals (Appendix D).

SHASCOM provides notifications from local emergency response teams to registered cell phones in the event of emergency situations or critical community alerts. County residents can register their cell phone numbers with SHASCOM's Code Red system to receive emergency notifications like evacuation notices, bio-terrorism alerts, boil-water notices, and missing child reports (SHASCOM, 2020). This notification system is specific to cell phones, is distinct from the County's alert system using landline phones, and was put in place in response to declining landline telephone use as more County residents switched to using cell phones exclusively (Sandhu, 2018).

3.5.1.3 Regulatory Setting

Federal

Federal Communications Commission

The FCC regulates interstate and international communications by radio, television, wire, satellite, and cable. The FCC implements the Communications Act and several commission rules and orders prohibiting radio frequency interference, and addresses complaints from consumers and public safety providers regarding communications interference.

FAA Regulations on Structures Affecting Navigation Signal Reception

The FAA is the federal agency that identifies potential impacts related to air traffic and related safety hazards. The FAA Federal Aviation Regulations (FAR) establish standards and notification requirements for proposed structures that will be in proximity to a navigation facility and may impact the assurance of navigation signal reception. FAA standards (14 CFR Part 77.9) generally require that applicants for any temporary or permanent structure that exceeds an overall height of 200 feet above ground level (as the proposed wind turbines would) or could impact the assurance of navigation signal reception file with the FAA prior to construction to obtain a determination

regarding potential obstructions to air navigation or navigational aids or facilities. This requirement to file a notice with the FAA would apply to the Project (FAA, 2020).

State

California Public Utilities Commission

The CPUC regulates privately owned telecommunications companies and other utilities including several licensees of the cellular and microwave communications signals described in Section 3.5.1.2, such as Pacific Gas & Electric Co. and telephone service providers such as T-Mobile. The CPUC may have regulatory oversight of certain aspects of changes to communications facilities if any are necessary as a result of the Project.

Local

Shasta County Multi-Jurisdictional Hazard Mitigation Plan

The Shasta County and City of Anderson Multi-Jurisdictional Hazard Mitigation Plan identifies communications as one of the "utility lifeline systems" deemed critical facilities by the Federal Emergency Management Agency (FEMA). Critical facilities are those in either the public or private sector that provide essential products and services to the general public, are otherwise necessary to preserve the welfare and quality of life in the region, or fulfill important public safety, emergency response and/or disaster recovery functions (Shasta County and City of Anderson, 2017).

3.5.2 Significance Criteria

Neither CEQA nor the CEQA Guidelines discusses interference to communications as a topic for analysis in CEQA documents. Nonetheless, as described above, the County chooses to address potential interference with communications as an environmental impact in this EIR. Accordingly, for purposes of this EIR, project would result in a significant impact to Communications Interference if it would:

a) Cause substantial interference to existing television and radio reception at residences in the vicinity;

b) Substantially interfere with existing navigational systems operated by the Federal Aviation Administration (FAA) or the U.S. military; or

c) Obstruct or prevent point-to-point microwave relay station transmissions that traverse the project site.

3.5.3 Direct and Indirect Effects

3.5.3.1 Methodology

For impacts on television broadcast communications, the 10 percent general rule described in Section 3.5.1.2 was used to estimate the number of households likely to be affected within the 215-square-mile service area of the stations that broadcast over the Project Site.

Microwave transmissions do not travel in perfectly straight lines. Each wave travels along an arc, and the arcs from multiple waves in a transmission form an ellipsoidal[2] shape between the transmitter and a receiver. For impacts on microwave communications, Evans Engineering Solutions created three-dimensional models of each proposed turbine and modeled the ellipsoidal zones in which microwave transmissions from known transmitters travel from the point of origin to a receiver (called a "Fresnel zone"). To determine whether the Project could have an adverse effect on microwave communications, the three-dimensional turbine models and Fresnel zones of microwave transmission paths were compared to determine whether these modeled shapes would intersect. See Appendix D for additional details.

3.5.3.2 Direct and Indirect Effects of the Project

Because the potential for interference on communications signals discussed in this section occurs as a result of the physical presence of wind turbines, any potential impacts would occur primarily during operation and maintenance. Impacts would begin during the construction phase as turbines are installed, and would persist through decommissioning for as long as turbines remain in place. However, the site clearing and reclamation phases, and the construction and decommissioning activities that would occur during those phases, would not affect communications. Therefore, the impact discussions below focus on the operation and maintenance phase.

a) Whether the Project would cause substantial interference to existing television and radio reception at residences in the vicinity.

Impact 3.5-1: The Project could cause intermittent interference to or freezing of television reception at some residences in the service area of the stations that broadcast over the Project Site. (*Less than Significant with Mitigation Incorporated*)

There are an estimated 600 residences within the 215-square-mile service area of the stations that broadcast over the Project Site. The engineering report assumes that about 55 percent of these residences use satellite or cable to receive television, meaning that the remaining 45 percent (270 residences) would rely on "over-the-air" television reception (Appendix D). However, because the County has not independently substantiated this assumption, this analysis conservatively uses a range of 270 to 600 residences relying on "over-the-air" reception. Using the 10 percent rule described in Section 3.5.3.1, an estimated 27 to 60 residences could experience intermittent interference or freezing of television reception as a result of the Project. The impact would be long-term, persisting throughout the life of the Project, but would cease after wind turbines are decommissioned and removed. This would be a significant impact because of the reliance of rural residents on "over-the-air" television broadcasts to receive information.

Mitigation Measure 3.5-1 is proposed to ensure that television interference impacts would be avoided or corrected, reducing the impact to less than significant.

[2] Ellipsoidal here refers to a shape similar to an elongated football.

Mitigation Measure 3.5-1: Correct or mitigate conflicts with television signals.

Prior to issuance of a construction permit from the County, the Applicant shall send notifications, via certified mail or other means that documents receipt, to all property owners of residences within the service area of the stations that broadcast over the Project site notifying them of the potential for interference with "over-the-air" television signals received by antenna. The notification shall provide contact information and instructions so that recipients may file a complaint with the Shasta County Department of Resource Management, Planning Division if interference occurs.

In the event that the County receives a verified complaint regarding television broadcast interference that is attributable to this Project, the Applicant will resolve receiver interference through coordination with property owners. Verification shall include a letter or report from a qualified third party supporting the conclusion that interference is attributable to the Project. The Applicant shall not be required to provide qualifying residents with better reception than they had before the construction and operation of the Project.

Significance after Mitigation: Less than significant.

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b) Whether the Project would interfere with existing navigational systems operated by the FAA or the U.S. military.

Impact 3.5-2: The Project would not interfere with existing navigational systems operated by the FAA or the U.S. military. (*Less-than-Significant Impact*)

Wind turbines have the potential to interfere with VOR aircraft navigational systems. The nearest airport with a VOR navigational system is over 35 miles from the Project Site. Little or no signal interference is anticipated when wind turbines are located more than 10 miles from a VOR beacon location (Angulo et al., 2014). Therefore, the impact would be less than significant.

Nonetheless, the FAA requires that a Notice of Proposed Construction (Form 7460-1) be filed for any object that would extend more than 200 feet above ground level. One aspect of the FAA's review of the Applicant's notice would evaluate the potential physical or electromagnetic effects on air navigation, communication facilities, and other surveillance systems (14 CFR §77.29[6]). Once the Form 7460-1 is reviewed by the FAA, the Applicant must implement measures to reduce any potential impacts on aircraft navigation in accordance with the requirements of FAA's analysis of the Form 7460-1. It is unlikely that the Project would cause physical or electromagnetic interference with aircraft navigational systems due to the distance to the nearest airport (Appendix D). However, if the FAA identifies potential effects, then the measures to reduce potential impacts may include an operational curtailment agreement (i.e., to bring turbines causing interference to a temporary stop) based on air navigation schedules may be negotiated, or the FAA could negotiate with the Applicant to fund upgrades to the existing potentially affected radar system (Department of Energy, 2016). Implementation of such legally required measures, if any are identified, also would ensure that this impact would remain less than significant.

Mitigation: None required.

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c) Whether the Project would obstruct or prevent point-to-point microwave relay station transmissions that traverse the Project Site.

Impact 3.5-3: None of the Project turbines would obstruct or prevent known point-to-point microwave relay station transmissions; however, interference could occur due to turbine location adjustments or currently unknown transmissions. (*Less than Significant with Mitigation Incorporated*)

As explained in Section 3.5.1.2, microwaves carry information such as radio, cell phone, and digital communications. The engineering report (Appendix D) found that none of the Project turbines would intersect with the Fresnel zones of the known microwave paths that cross the Project Site; therefore, they would not obstruct or prevent point-to-point microwave transmissions. No impact would occur based on the proposed turbine locations and known microwave paths.

However, as noted in the engineering report, although the third party and FCC databases relied on for this analysis typically are very accurate, it is possible that some microwave facilities have not been accurately represented, and that interference could occur. Additionally, if wind turbine siting were to be adjusted during final design, it is possible that wind turbines could overlap with the transmission zones. Either scenario could result in interference with microwave transmissions, which could result in a significant impact on County residents and public safety because these transmissions are frequently used for emergency communications. If such an impact were to occur, it would be long-term, persisting throughout the life of the Project, but would cease after wind turbines are decommissioned and removed.

Therefore, while no significant impact is anticipated based on information known at the time of this analysis, Mitigation Measure 3.5-3 is proposed to ensure that microwave interference impacts would be avoided or corrected, reducing the impact to less than significant.

Mitigation Measure 3.5-3: Correct or mitigate conflicts with microwave signals.

Prior to issuance of a construction permit from the County, the Applicant shall notify, via certified mail or other means that documents receipt, all owners of frequency-based communication stations and towers within 2 miles of the Project Site. The notification shall provide the locations of all turbines and shall provide contact information and instructions so that recipients may file a complaint with the Shasta County Department of Resource Management, Planning Division if interference occurs.

In the event that the County receives a verified complaint regarding microwave transmission interference that is attributable to this Project, the Applicant will resolve receiver interference through coordination with owners of frequency-based communication stations and towers. Verification shall include a letter or report from a qualified third party supporting the conclusion that interference is attributable to the Project. Possible actions include the Applicant being responsible for installation of high-performance antennas at nearby microwave sites, if required. The Applicant shall not be

required to provide qualifying owners with better signals than they had before the construction and operation of the Project.

Significance after Mitigation: Less than significant.

3.5.3.3 PG&E Interconnection Infrastructure

The PG&E interconnection infrastructure described in Section 2.4.3 would be substantially shorter in height than the proposed wind turbines, and so would have commensurately less potential to cause communications interference. This infrastructure would not contribute to potential interference with microwave and cellular communications or television broadcast signals because the structures would be much smaller than the wind turbines and would not involve the movement of turbine blades. Additionally, the PG&E facilities could require a relay microwave tower or overhead fiber optic communication circuits; however, these facilities would be designed to avoid or minimize interference with existing communication facilities. Therefore, impacts on these communication types would be less than significant and Mitigation Measures 3.5-1 and 3.5-3 would not apply to the PG&E interconnection infrastructure. The minor modifications or upgrades to the existing 230 kV line and the additional poles needed to connect the Project switching station would not involve structures taller than 200 feet and thus would not need FAA review for navigation interference. The impact related to navigational communications also would be less than significant.

3.5.3.4 Direct and Indirect Effects of Alternatives

Alternative 1: South of SR 299

Under Alternative 1, fewer turbine locations would be developed (with A01 through A07 omitted), and all of the turbine locations included in this alternative would be at least as far away from land mobile/public safety radio transmitter stations, earth satellite stations, AM broadcast facilities, television broadcast facilities, aircraft navigation beacons, and microwave and cellular communication facilities as described for the Project. Therefore, the potential impacts on television reception (Impact 3.5-1), aircraft navigation (Impact 3.5-2), and microwave and cellular communication (Impact 3.5-3) would be the same as described for the proposed Project, although there may be a small reduction in the potential for unforeseen microwave communication interference because the turbines north of SR 299 would not be constructed (turbines A01, A02, and A03 are some of the closest to known microwave paths, as identified in Appendix D, but would not interfere with the Fresnel zones of these paths and so are not expected to cause interference). Mitigation Measures 3.5-1 and 3.5-3 would apply to Alternative 1 and would reduce impacts 3.5-1 and 3.5-3 to less-than-significant levels, respectively.

Alternative 2: Increased Setbacks

Under Alternative 2, fewer turbine locations would be developed (with B01, D05, K02, and M03 omitted), and all of the turbine locations included in this alternative would be at least as far away from land mobile/public safety radio transmitter stations, earth satellite stations, AM broadcast

facilities, television broadcast facilities, aircraft navigation beacons, and microwave and cellular communication facilities as described for the Project. Therefore, the potential impacts on television reception (Impact 3.5-1), aircraft navigation (Impact 3.5-2), and microwave and cellular communication (Impact 3.5-3) would be the same as described for the proposed Project, although there may be a small reduction in the potential for unforeseen microwave communication interference because several turbines would not be constructed (turbine D05 is one of the closest to known microwave paths, as identified in Appendix D, but does not interfere with the Fresnel zones of these paths and so is not expected to cause interference). Mitigation Measures 3.5-1 and 3.5-3 would apply to Alternative 2 and would reduce impacts 3.5-1 and 3.5-3 to less-than-significant levels, respectively.

No Project Alternative

If the No Project Alternative is implemented, none of the proposed wind turbines, meteorological towers, or other related infrastructure would be constructed, operated and maintained, or decommissioned on the Project site. The Project site would continue to be operated as managed forest timberlands. Because there would be no change relative to baseline conditions, the No Project Alternative would create no impact related to Communications Interference.

The Project Site is zoned for timber production. Pursuant to regulations implementing the California Timberland Productivity Act (Government Code §51100 et seq.; 14 Cal. Code Regs. §897[a]), there is a legal presumption that "timber harvesting is expected to and will occur on such lands." The regulations further specify that timber harvesting on such lands "shall not be presumed to have a Significant Adverse Impact on the Environment" (14 Cal. Code Regs. §898). Therefore, the No Project Alternative, including anticipated timber harvesting, is not presumed to result in a significant adverse individual or cumulative effect.

3.5.4 Cumulative Analysis

Although a potential less-than-significant impact on aircraft navigational systems is identified under Impact 3.5-2, the Project ultimately would avoid any impacts on navigation and could not contribute to a cumulative impact on aircraft navigational systems because the Project would be required by law to comply with the requirements of FAA's analysis of impacts on navigation prior to construction and operation of the Project. For this reason, neither the Project nor an alternative would cause or contribute to a potential cumulatively significant impact in this regard.

The geographic scope for cumulative effects related to television reception includes the 215-square mile combined service area of the stations that broadcast over the Project Site. For impacts on microwave and cellular transmissions, the geographic scope includes the extent of the paths crossing the Project Site; this includes transmission stations at either end of each path. The temporal scope of impacts on both types of transmissions includes the time from initial construction of any turbine causing interference to full resolution of the interference as required by Mitigation Measures 3.5-1 and 3.5-3.

The existing Hatchet Ridge Wind Project site is located about 6 miles east of the Project Site and is crossed by some of the same television broadcast signals that cross the Project Site. As explained under Impact 3.5-1, the Project could cause intermittent interference to television reception, a potentially significant impact before mitigation. The existing wind turbines at Hatchet Ridge already have been evaluated in the EIR for that project and their role in television broadcast transmission interference addressed by implementation of Mitigation Measure USS-1, which required notification and correction of interference similar to what is required under Mitigation Measure 3.5-1 for the proposed Project (Shasta County, 2008). Therefore, the existing Hatchet Ridge Wind Project would not cause interference with the same television broadcast signals during the same timeframe that the Project could cause interference, and the two projects' impacts would not combine to result in a significant cumulative impact.

The existing Hatchet Ridge Wind Project is located within an area crossed by the same microwave paths that cross the Project Site, which include paths licensed to the State of California, PG&E, Citizens Telecom of California, Southern Oregon University, New Cingular Wireless PCS, Transmission Agency of California, Smg-Redding LLC, Paradise KCVU-TV, and Sinclair California (Appendix D; Comsearch, 2007). As explained under Impact 3.5-3, the Project would not cause transmission interference for any of these paths based on the location information currently known; however, interference is possible if these paths have not been accurately represented in existing databases. Therefore, the Project could cause a significant impact on these transmissions before mitigation. The existing wind turbines at Hatchet Ridge already have been evaluated in the EIR for that project and their role in microwave and cellular transmission interference addressed by implementation of Mitigation Measure USS-1, which required notification and correction of conflicts similar to what is required under Mitigation Measure 3.5-3 for the proposed Project (Shasta County, 2008). Therefore, the existing Hatchet Ridge Wind Project would not cause interference with the same signals during the same timeframe that the Project could cause interference, and the two projects' impacts would not combine to result in a significant cumulative impact.

3.5.5 References

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