memo

skyguide

from Favey Laurent / OOLA
to IFP, Airspace, CNS, TNP

subject **WT Assessment - Eriswil**

date 2018-01-15
cc --

Emch + Berger AG requested an assessment of one wind turbine projects which is located in Eriswil on 9 October 2017.


Figure 1 Location of Eriswil wind turbine project

| Name | X (CH03) | Y (CH03) | Z [m] | WT Height [m] | Vert. tol.[1] [m] | Total height [m] |
|---|---|---|---|---|---|---|
| Eriswil 1 | 632'886 | 213'363 | 918 | 230 | 2 | 1150 |

Table 1 Wind turbine project "Eriswil" description and its associated height

The following routes have been analysed to assess if there was any impact on them:

| Route name | Eriswil WT potential impact |
|---|---|
| G5 | no impact |
| J71 | no impact |
| N871 | no impact |
| T625 | no impact |
| Z55 | no impact |
| Z57 | no impact |

Table 2 Routes assessed for potential impact

[1] DHM measurement error (swisstopo)



member of FABEC

The following IFP procedures have been analysed to assess if there was any impact on them:

| Procedure name | Eriswil WT potential impact |
|---|---|
| LSZC SID WIL 3A | no impact |
| LSZB STAR WIL 2M/2N | no impact |
| LSZB STAR WIL 2P | no impact |
| LSZG HLDG ARVAN | no impact |
| LSME ASMA | impacting 5000 ft sector (see Fig.2) |
| LSZB ASMA (-4°C and -20°C) | no impact |
| LSZH ASMA | impacting 5000 ft sector (see Fig. 3) |
| LSME MSA | no impact |
| LSZB MSA | no impact |
| LSZC MSA | no impact |
| LSZG MSA | no impact |

Table 3 Procedures assessed for potential impact

### ATC Surveillance Minimum Altitude (ASMA) assessment

ATC Surveillance Minimum Altitude (ASMA) assessment is done with a 3 NM buffer around the considered obstacles when they are distant of less than 20 NM from a primary radar antenna, as described in ICAO DOC 8168 Vol. 2 6th edition, chapter 6 SRE, § 6.2.3, letter b (p. 512). If the considered obstacles are distant of more than 20 NM, a 5 NM buffer is then applied.

Wind turbine Eriswil is inside the 20 NM distance from Emmen primary surveillance radar (LSME FLUR90). A 3 NM buffer is applied to this wind turbine when assessing LSME ASMA.

Wind turbine Eriswil is outside the 20 NM distance from Zurich primary surveillance radar (LSZH HL1P). A 5 NM buffer is applied to this wind turbine when assessing LSZH ASMA.

### Impact on LSME ASMA sector 5000 ft

An impact by Eriswil wind turbine project has been highlighted on the sector 5000 ft of LSME ATC Surveillance Minimum Altitude (ASMA) -20°C, as depicted in Figure 2.

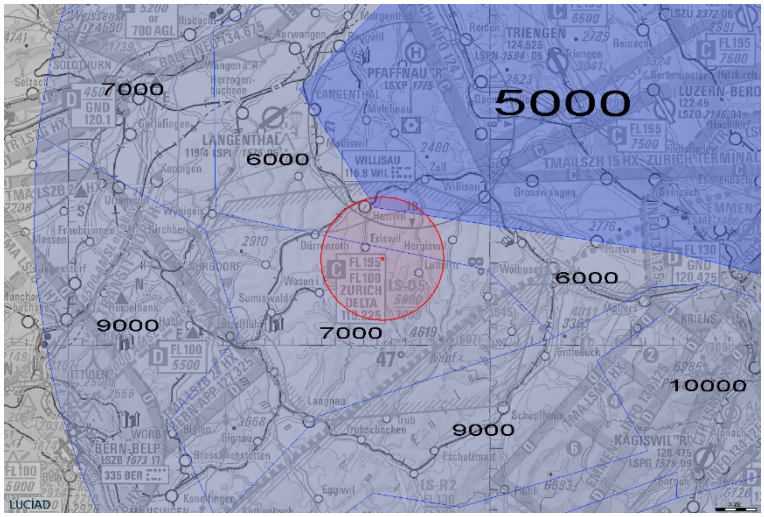


Figure 2 Impact of Eriswil wind turbine project on LSME ASMA -20°C

| | Eriswil wind turbine |
|---|---|
| Altitude of obstacle | 1150 m |
| Minimum Obstacle Clearance (MOC) | 300 m |
| Correction for cold temperature (up to -20°C) | **82 m** ≈ 268 ft |
| Minimum Overflight Altitude | **1532 m** ≈ 5026 ft |
| Published ASMA | 1524 m ≈ **5000 ft** |
| **Effective Obstacle Clearance** | **374 m** ≈ 1227 ft |

Effective obstacle clearance should be at least **382 m**.

Maximum height on top of wind turbine (rotor): **1143 m** ≈ **3750** ft

In order to solve this issue, two options are available:

1. The maximum height of the wind turbine "Eriswil" shall not exceed 1143 m AMSL at the top of the rotor.
2. The sector 5000 ft of LSME ASMA shall be raised by 100 ft to 5100 ft on the impacted portion or reshaped to cover the impacted area by the adjacent 6000 ft sector, provided Emmen Operations accept this modification (safety assessment needed).

For option 2, this would mean wind farm developer has to support the costs of this modification. Skyguide shall be informed at least 9 months prior starting construction work, in order to conduct the necessary work to publish the new LSME ASMA.

### Impact on LSZH ASMA sector 5000 ft

An impact by Eriswil wind turbine project has also been highlighted on the sector 5000 ft of LSZH ATC Surveillance Minimum Altitude (ASMA) -20°C, as depicted in Figure 3.

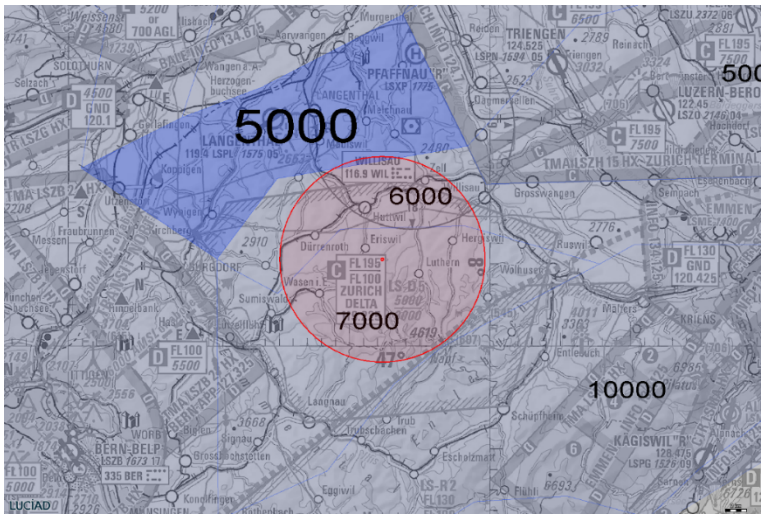


Figure 3 Impact of Eriswil wind turbine project on LSZH MVA -20°C

| | Eriswil wind turbine |
|---|---|
| Altitude of obstacle | 1150 m |
| Minimum Obstacle Clearance (MOC) | 300 m |
| Correction for cold temperature (up to -20°C) | **82 m** ≈ 268 ft |
| Minimum Overflight Altitude | **1532 m** ≈ 5026 ft |
| Published MVA | 1524 m ≈ **5000 ft** |
| **Effective Obstacle Clearance** | **374 m** ≈ 1227 ft |

Effective obstacle clearance should be at least **382 m**.

Maximum height on top of wind turbine (rotor): **1143 m** ≈ **3750** ft

In order to solve this issue, two options are available:

1. The maximum height of the wind turbine "Eriswil" shall not exceed 1143 m AMSL at the top of the rotor.
2. The sector 5000 ft of LSZH ASMA shall be raised by 100 ft to 5100 ft on the impacted portion or reshaped to cover the impacted area by the adjacent 6000 ft sector, provided Zurich Operations accept this modification (safety assessment needed).

For option 2, this would mean wind farm developer has to support the costs of this modification. Skyguide shall be informed at least 9 months prior starting construction work, in order to conduct the necessary work to publish the new LSZH ASMA.

All other routes and procedures are not impacted by this project.

All these routes and procedures are available in file "Eriswil_2017.lws".

After assessing all these routes and procedures, two of them are impacted by "Eriswil" wind turbine project.

IFP can therefore grant a **conditional notification** for wind farm project "Eriswil", provided that:

- wind turbine "Eriswil" maximum height does not exceed 1143 m AMSL at the top of the rotor, or
- LSME and LSZH ASMAs sectors 5000 ft are either raised or reshaped to exclude 3 NM / 5 NM buffer areas.

This notification is valid with a lateral tolerance of 150 m and a vertical tolerance of 20 m.

This notification is valid for 4 years.

skyguide
OOLA

Laurent Favey