Appendix VI

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Requirements for a coordination enclosure and their Area potential Evaluation

For the first time, the idea of a coordination center for the interim sheltering of genetically valuable lynx from ex situ breeding programs (consistently subspecies-oriented enclosure breeding from recognized zootechnical institutions) holds enormous advantages for goal-oriented population management within ex situ populations in the European wilderness. From here, the animals are transferred

a) to reintroduction projects or

b) to breeding groups of other zoological institutions.

The removal of adult lynx from the wild and reintroduction into another habitat is already an interference in an obviously well-functioning in-situ population. The exception is the removal and rearing of lynx orphans, which would have no chance of survival in the wild anyway.

The removal of lynx from selective ex- situ programs, as has been and is being successfully documented in the Harz, contributes enormously to the improvement of the enclosure quality of the lynx (offspring as part of the natural behavioral repertoire). This permits long-term behavioral and health monitoring in advance, on the one hand for the settlement of preferred animals, and as well for further animals that are returned to suitable enclosures as breeding potential. They continue to be considered as a genetic reserve for wild stocks.

Requirements of coordination enclosures

The recommendations for the keeping of wild animals in enclosures are based on the subject-specific content of the "Minimum requirements for the keeping of mammals" of the Federal Ministry of Food and Agriculture (2014), which distinguishes between intensive keeping in classical zoological institutions and extensive keeping in spacious wildlife parks. The expertise "Guidelines for keeping wild animals in enclosures in a welfare friendly manner" (BML 1995) are of particular importance under the above-mentioned aspects.

These requirements are outlined in the following:

Basic expertise	Notes	Total minimum area [m²]	Enclosure	Height [cm]	Stables, shelters [type of construction]
Expertise on Minimum requirements for the keeping of mammals (2014)	Predominantly overgrown floor, elevated lying areas, opportunities for evasion and hiding, sand areas, climbing opportunities, vertical use of the enclosure, litter boxes, barriers, minimum stable height 2.50 m.	Intensive: x50/1 (verb. EG) Separation enclosure: (10m²/1)	Open or closed constructions are possible	250	Unheated individual cages/boxes in sufficient number and size (animal must be able to lie down, stand up, turn around).
		extensive: x150/1 (verb. EG) Separation enclosure: (30m²/1)			
Guidelines for the conservation of wild animals in enclosures (1995)	Open area, natural ground, near-natural design, separation enclosure required	1200 m²/ pair		n.d.	Special warm house is not necessary

In any case, sufficient separation enclosures are necessary, which should also be enclosed like an aviary-like, especially in the case of a forest enclosure, in order to secure the animals during storms. Two variants for the maintenance of such an enclosure are possible:

Option I - Minimum Equipment

The coordination enclosure consists of three individual enclosures that are connected to each other via sliders. Each individual enclosure is at least 600 m² in size. As the facility serves the purpose of reintroduction and is intended to promote near-natural behavior, the requirements are higher than for the expert opinions cited above. Two enclosures have a capture system, which can be reached via a keeper's corridor. (see plan "1 - version with minimum dimensions)

Cameras are used to monitor the animal population, especially outside the presence times of the animal keepers.
In order to involve the public in the lynx reintroduction project and to make the background of the project transparent, it is also possible to provide insights into the enclosures via cameras and webcams, always without revealing the location of the coordination enclosures.

Option II – Best Practice

Ideally, the coordination facility consists of three spacious individual enclosures that are connected to each other via sliders. The floor areas are 1,500 m², 800 m² and 600 m². Two separation enclosures (30 and 40 m²) allow the separation and capture of animals. Within the two enclosures, the animals have access to a covered area of approx. 20m². This is equipped with four lounging boards (each 1.10 x 0.50m). The separate keepers' area is directly connected to the separation enclosures and is equipped with a treatment table, freezer and all necessary equipment for the daily care and monitoring of the animals.

Cameras also allow continuous monitoring of the animal population in the enclosures, especially outside the presence of the animal keepers. The technical supply is provided via a directly adjoining technical room. (see plan "2 - Best Practice Option with minimum dimensions)

Area potential assessment

An evaluation matrix was developed for a more objective assessment of the areas that could be considered for the construction of coordination facilities. This covers 28 factors in 15 categories, which are rated on a scale of 1 to 5 when assessing each potential site. In order to match the complex considerations behind the selection of suitable areas, all 28 factors have also been weighted (between 1 and 5). Depending on the requirements and objectives, the weighting can be varied.

The calculation is done by multiplying the assessment factors and their respective locally determined weights. The sum of these results is then divided by the sum of the factor weights.

$$Evaluation = \frac{Sum(Evaluation\ factor) * Site\ assessement}{Sum(Evaluation\ factor)}$$

This results in a score for each site between 1 and 5, which takes into account all the requirements of the coordination facilities. In case evaluation factors do not have to be applied for regional reasons, the decision for a location can still be made objectively.

Disturbance factors that can lead to negative conditioning (adaptation to urban habitats, road and rail traffic, etc.) of the animals to be released cannot be defined in a measurable way according to current state of knowledge.

Therefore, social aspects should also be taken into account in the selection of locations:

1. The reintroduction of lynx (especially translocation) is an intervention in nature whose success cannot be 100% guaranteed. Similar to an animal experiment proposal, problems can be named and, if necessary, solutions can be pointed out. The prerequisite is the selection of animals that are purely subspecies and, if possible, not related to each other.

2. Individuals from ex-situ breedings cannot be released in an uncontrolled manner due to legal regulations and relevant controls (timely identification and reporting of offspring). Thus, the selection of individual animals from the coordination enclosures will always be a case-by-case decision.

   Generally, only locally limited reintroductions of individuals are carried out, which are under constant control (monitoring). Participating in these programs is also a potential burden for breeders, as they also have to bear long-term responsibilities for animals that are not suitable for release into the wild.

3. Due to the location loyalty of the female cats, we need many breeding enclosures in order to obtain offspring from different parents. Relocating female cats that are already breeding is not in accordance with animal welfare.

4. Parameters of the coordination enclosures

   The avoidance of human influence during the stay of the lynx in the coordination enclosures is indisputable. It is difficult to define which external parameters should be taken into account.

4.1. Acoustic disturbance factors

It should be taken into account that the hearing ability of the lynx is extraordinarily pronounced and thus a high sensitivity is to be expected.

Here, traffic on roads and railways as well as anthropogenic concentrations in urban centres play an essential role. It is less a question of disturbance than of habituation of the animals to it, which should be avoided as far as possible.

One solution would be to select at least three sites for a coordination enclosure and to choose the least disturbed area.

4.2. Visual disturbance factors

Visual abilities of lynxes are also remarkable. Geographical orientation is achieved, among other things, by landmark recognition (source?). Concealing visitor pathways prevents the lynx from gaining a sufficient overview despite acoustic perception.

We recommend a solution like the one described in 4.1.

4.3. Olfactory disturbance factors

No disturbance to be expected.

4.4 Topography

The enclosure topography appears to have an extraordinarily high influence on the behaviour and well-being of lynx.

Enclosures with a significant variation in altitude are preferable to flat areas. This can also lead to positive conditioning and thus to the selection of sites preferred later in the wild (e.g. birth dens).

5. Conclusion

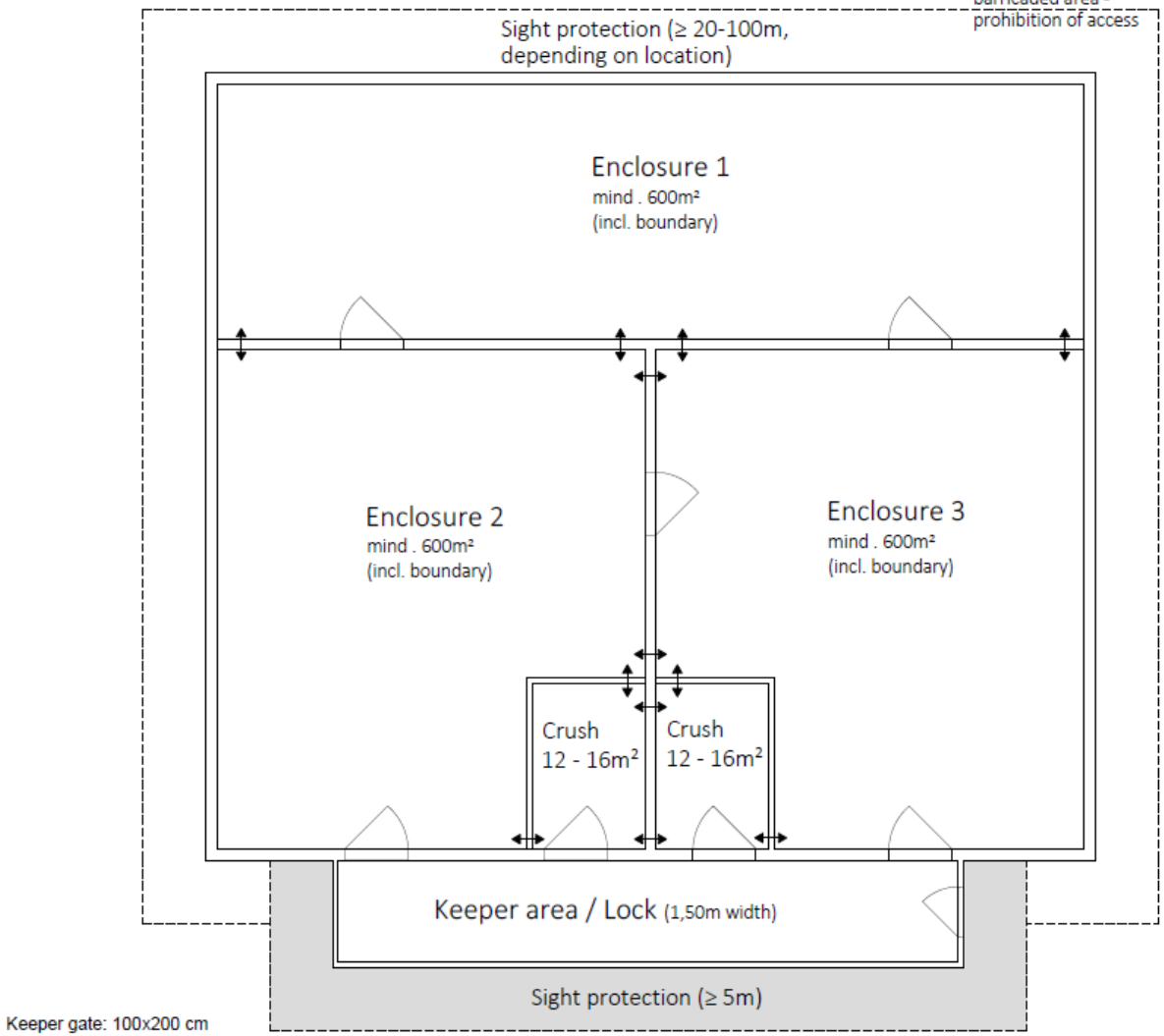
Considering these aspects, rural areas are preferable for coordination enclosures. Areas with appropriate altitude differences have priority over plains.

Two enclosure boundaries facing away from each other and free from acoustic and visual disturbance are in any case more advantageous than enclosure concealment by means of artificial or natural visual barriers. A variant study of at least three sites allows for an objective selection of the most suitable enclosure area for the region.

	Enclosure definition: Coordination enclosure	*The coordination enclosure serves as a collection centre for genetically valuable lynx, primarily from enclosures intended either directly for release into targeted habitats or as potential breeding animals for future husbandry. The length of time an individual is kept in a coordination enclosure should not exceed 2 years. The enclosure has different interconnectable compartments, all of which can be used in the best possible way for scientific monitoring. For the use of the enclosures as breeding facilities, further requirements and details should be clarified separately....*						
		Information	**Quality**	**Location A**	**Location B**	**Location C**	**Location D**	**Note / remark**
1	Land and soil	Conservation status (potential enclosure) (particularly worth protecting = 1, Stock not worth protecting = 5)	3					
		Ownership, purchase necessary (all own-owned = 5, all third-party owned =1)	1					Valuation of costs takes place under pos. 12
		Forest conversion permit required (yes=1, no=5)	3					
		Other requirements (e.g. FNP, B-Plan)	2					
2	Base area enclosure	The larger the enclosure area, the more successfully animals can be prepared for life in the wild: < 800 m² = 1; 1; 800 - 1.000 m² = 3; ≥ 1.500 m² = 5	3					
3	Structure of the enclosure	A park-like forest structure reflects the habitat of the lynx and at the same time provides the necessary observation opportunities for the staff.	2					
4	Number of enclosures ???	Division into connectable individual enclosures: Main enclosure + separation = 2 2 main enclosures + separation = 3 2 main enclosures + 2 separations = 4 ≥ 3 main enclosures + 2 separations = 5	3					Recommendation: per main enclosure in sizes like pos. 2; Separation: ≥ 30 m² Separation enclosure with infrastructure (water, sewage, electricity, etc.)
		Separation enclosures with special hygienic requirements	1					
5	Social structure	Lynx can be very compatible with each other in family groups. Nevertheless, it must be possible to avoid problems. The short-term separation of individuals must be guaranteed (quality of sliding elements, operability).	2					Connectable single units Sufficient number of gate sliders and rope pulls
6	Breeding behaviour	Restrictions in the breeding behaviour of enclosure lynxes in neighbourhood to unrelated lynxes	1					Coordination enclosures should be at least ≥ 200 m away from breeding facilities
7	Transfer conditions	According to the enclosure definition, there will be comparably frequent fluctuations in the animal population: - "covert" observation possible (decision for transfer) - Access possibilities - Capture possibilities (anaesthesia, trap, net???)	3					

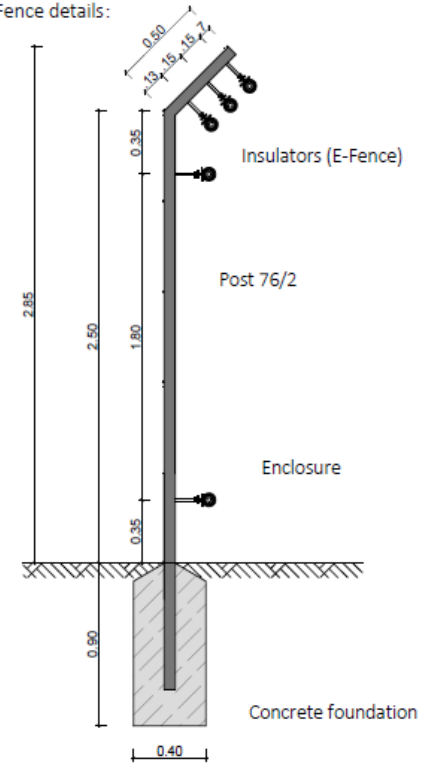
8	Localisation of the coordination facility	Within a show enclosure = 1 Location connected to local recreation area = 2 Distance to public paths with double fencing and visual protection ≥ 100 m = 3 Facility inaccessible (visually, acoustically, olfactorily) = 5	5					within a show enclosure = KO
9	Technical fencing	Anforderung an die Errichtung eines 2. Außenzaunes auf Potentialfläche: komplett (=1), teilweise (=3), nicht notwendig (=5)	1					The quality of the fencing depends on the environment and visitor frequency: highly stability, safety requirements and expected maintenance and care = 1 rather extensive system = 5
		Impact of the tree population on the outer fence route (necessary clearing, special tree protection against climbing over/leaping over).	2					
		Effort for the distance to public paths (distance, visual protection, vegetation?)	2					
10	Infrastructure	Water, Broadband????/Video/Webcam	3					
11	Investment costs	Total costs (very high = 1, very low = 5)	1					may also be dropped if confirmed by the MLR.
		Possibility of regional promotion (few possibilities = 1, many possibilities = 5)	1					
		Possibility of national promotion	1					
		Possibility of international funding	1					
12	Maintenance intensity	Animal care expertise	3					Quantity and qualification
		Veterinary and zoological inspection	3					Quantity and qualification
		Distance to the operating institution	2					Evaluation by distance indication of the sites in comparison
13	Location analysis	Promotional concept for increased acceptance by visitors of the operating institution	3					meaning: long-term care is provided by the institution; construction is provided by funding/donations, etc. Institution contributes significantly to promoting acceptance of the lynx in the wild Acceptance as an opportunity for cooperation Involvement of hunters
		Possibility of a central national advertising management	3					
14	Running costs	Management by operating institution proportionate and secured in the long term	3					an operation run independently by an institution is the most expensive option and could be a knock-out criterion
		Institution must be organised independently	3					
15	Timeframe	Estimated planning and implementation phase	5					
		Total evaluation		**0,00**	**0,00**	**0,00**	**0,00**	

Schematic layout



Keeper gate: 100x200 cm
Sliding doors: 400 x 700 mm

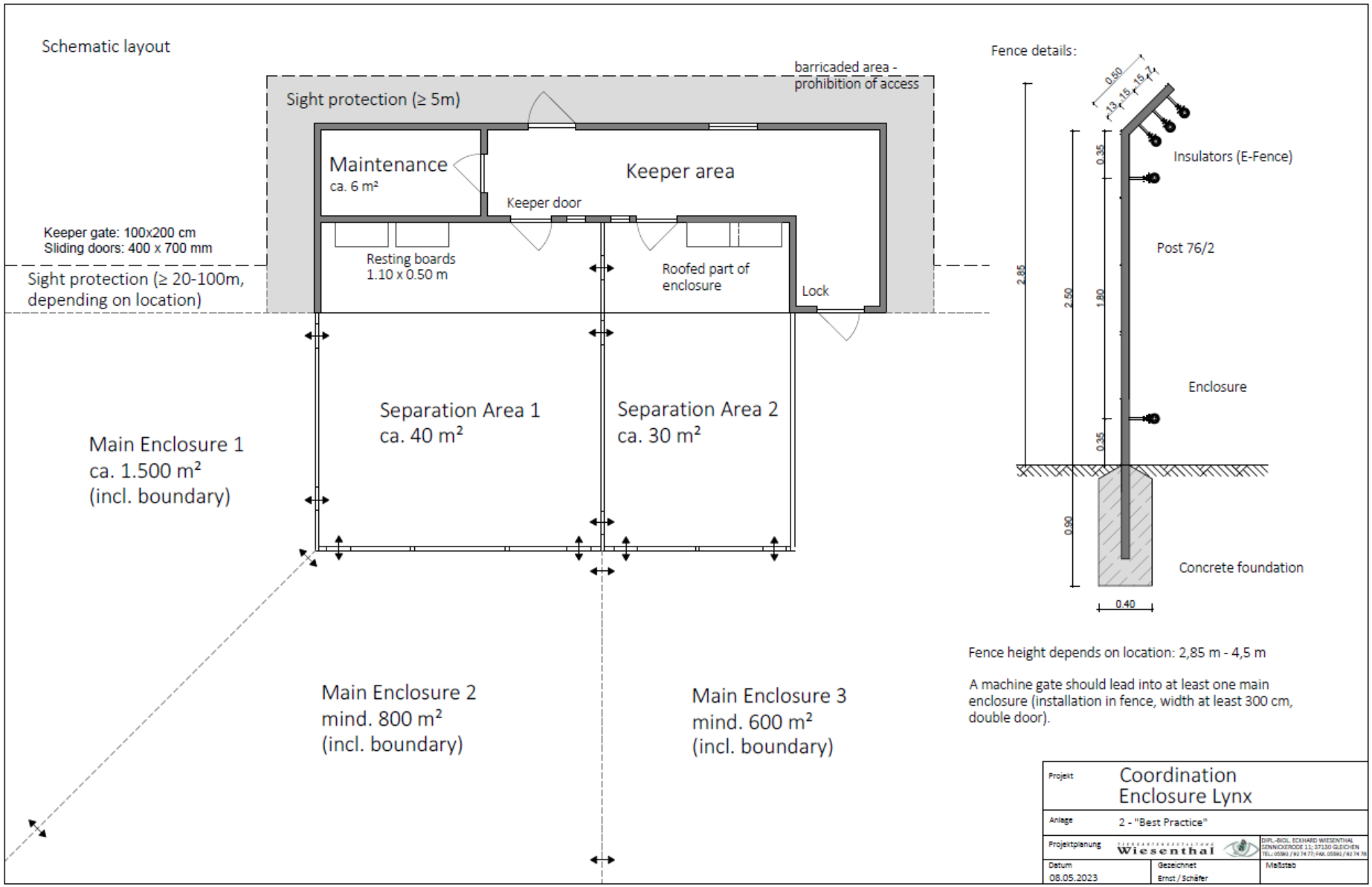
Fence details:



Fence height depends on location: 2,85 m - 4,5 m

A machine gate should lead into at least one main enclosure (installation in fence, width at least 300 cm, double door).

Projekt	Coordination Enclosure Lynx	
Anlage	1 - Minimum requirements	
Projektplanung	Wiesenthal	DIPL.-BIOL. ECKHARD WIESENTHAL GENNOVERSODE 11, 37130 GLEICHEN TEL.: 05592 / 92 74 77; FAX: 05592 / 92 74 78
Datum 08.05.2023	Gezeichnet Ernst / Schäfer	Maßstab


Schematic layout
barricaded area - prohibition of access
Sight protection (≥ 5m)
Maintenance
ca. 6 m²
Keeper area
Keeper door
Keeper gate: 100x200 cm
Sliding doors: 400 x 700 mm
Resting boards
1.10 x 0.50 m
Roofed part of enclosure
Lock
Sight protection (≥ 20-100m, depending on location)
Main Enclosure 1
ca. 1.500 m²
(incl. boundary)
Separation Area 1
ca. 40 m²
Separation Area 2
ca. 30 m²
Main Enclosure 2
mind. 800 m²
(incl. boundary)
Main Enclosure 3
mind. 600 m²
(incl. boundary)
Fence details:
Insulators (E-Fence)
Post 76/2
Enclosure
Concrete foundation
0.50
0.13
0.15
0.15
0.35
2.85
2.50
1.80
0.35
0.90
0.40
Fence height depends on location: 2,85 m - 4,5 m
A machine gate should lead into at least one main enclosure (installation in fence, width at least 300 cm, double door).
Projekt
Coordination Enclosure Lynx
Anlage
2 - "Best Practice"
Projektplanung
Wiesenthal
DIPL.-BIOL. ECKHARD WIESENTHAL
Datum
08.05.2023
Gezeichnet
Ernst / Schäfer
Maßstab