

General information

Project name	Underground Forest Naaldwijk	
Project code	UGF-L-011	
Remover	Underground Forest	
Location	Naaldwijk, The Netherlands	
Area	5.17	ha
Start year	2025	
Duration	>1000	years
Holding pool	20%	

Per project

Baseline TEC	0	tCO2
Reference capacity	308	tCO2
LCA emissions	24	tCO2
Storage potential	284	tCO2

Removal certificates

Holding pool	57	
Potential units issued	227	CRCs

Technokas

Estimated permanence of removal and storage
Freed up when project is implemented

Above Ground carbon is not removed for the project

Capacity of CO2 storage

Project related emissions

Projection +/- baseline



Field Code	Field name	Size (ha)	Owner	Notes
001	Naaldwijk Techr	5.17	VDL-BRASIL	Va Carbon storage rights handed ov

#	Field code	Field	Year	Date	Sample depth	SOC/AGB
001	001	Naaldwijk Technok	2022	1-1-2022	-	AGB
003		#REF!	#REF!			
005		#REF!	#REF!			
006		#REF!	#REF!			
007		#REF!	#REF!			
008						
009						
010						
011						
012						

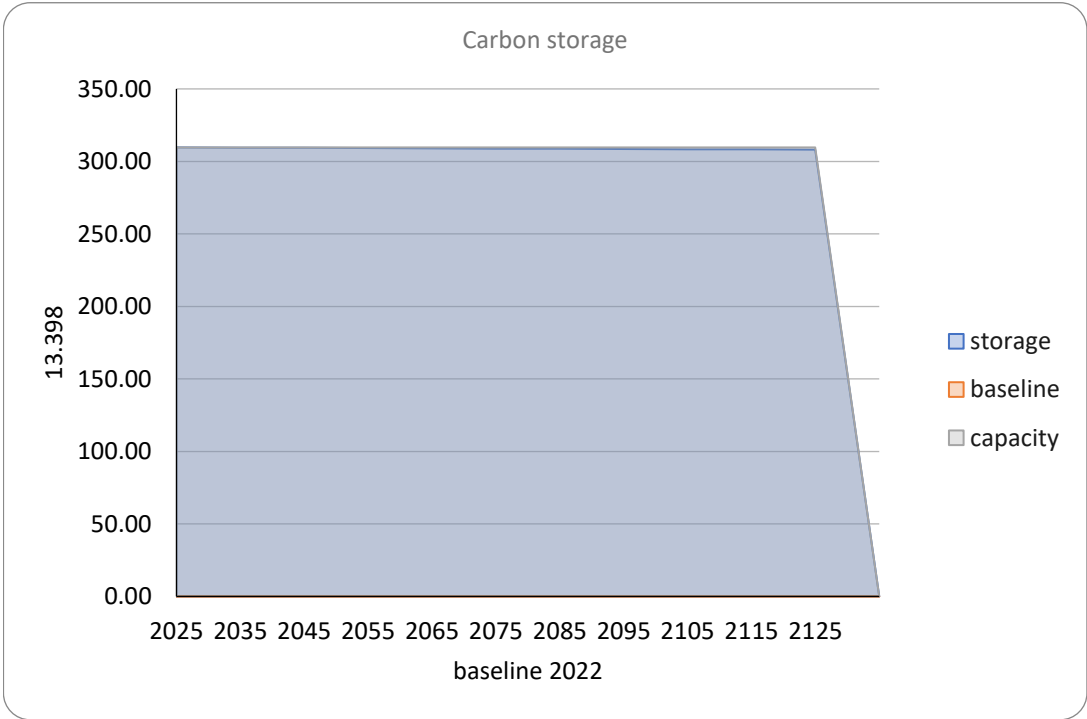
Carbon (g/kg)	AGB (tCO2/ha)	Sample/report nr.	Notes
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-	0.00	ESA	baseline
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Carbon Calculation for UGF-L-011

Surface	5.17 ha	Fields tab
Baseline AGB	0.00 tCO2e/ha	Measurements tab
Capacity Reference	309.64 tCO2e	References tab

	storage	baseline	capacity
2025	309.64	0.00	310
2035	309.49	0.00	310
2045	309.33	0.00	310
2055	309.18	0.00	310
2065	309.03	0.00	310
2075	308.87	0.00	310
2085	308.72	0.00	310
2095	308.56	0.00	310
2105	308.41	0.00	310
2115	308.25	0.00	310
2125	308.10	0.00	310



Sources

value	source	URL	Notes
CEDA aboveground biomass carbon	https://climate	https://dataceda	2010-2020 data
SOC	A critical review of the conventional SOC to SOM conversion factor		
Density	Wageningen L	https://edepot.w	We've added these soil density leve
From C to CO2	3.666666667		

Yearly degradation 0.00005 <https://www.shr> Klaassen, 2015

Variables	Unit	Source
Density of spruce	460 kg/m ³	https://www.wur.nl/upload_mm/e/b/t
Spruce C content	50.35% C content	https://www.sciencedirect.com/science
Wood moisture content	12.70% water content	https://www.sciencedirect.com/science
CO2e per m3	753.54 kgCO2/m ³	formula from:
Total volume of spruce	410.92 m3	
Total Underground CO2	309.64 tCO2	
Total amount of wood	189 t	

	Number	Pile length	Pile point (cm)
binnenkolommen	61	6.5	11.0
binnenkolommen	163	9.0	11.0
binnenkolommen	255	10.0	11
binnenkolommen	160	10.5	11
binnenkolommen	35	11.5	11
binnenkolommen	236	14.5	11.0
binnenkolommen	80	16.0	11.0
buitengevelkolommen	16	5.0	11.0
buitengevelkolommen	28	8.5	11.0
buitengevelkolommen	23	9.0	11.0
buitengevelkolommen	6	10.0	11.000
buitengevelkolommen	37	13.0	11.000
buitengevelkolommen	14	5.5	11.000
buitengevelkolommen	8	8.0	11.000
buitengevelkolommen	14	9.0	11.000
buitengevelkolommen	4	9.5	11.000
buitengevelkolommen	15	10.5	11.000
buitengevelkolommen	22	13.5	11.000
buitengevelkolommen	22	15.0	11.000
Betonpad	42	10.0	16.000
Betonpad	108	16.0	16.000
Betonpad	122	11.5	16.000
Betonpad	4	15.0	16.000
Betonpad	46	10.5	16.000
Betonpad	4	16.0	16.000
Trafo	4	10.5	11.000
Trafo	4	13.5	11.000

Mean point diameter (cm)	11.000	11.000	11.000
Increase per m (cm)	0.800	0.800	0.800
Pile length	6.5	9.0	10.0
Mean measurement point	3.250	4.500	5.000
Mean diameter	0.136	0.146	0.150
Volume pile	0.094	0.151	0.177
Piles per m3	10.591	6.637	5.659

Mean point diameter (cm)	16.000	16.000	16.000
Increase per m (cm)	0.800	0.800	0.800
Pile length	10.0	16.0	11.5
Mean measurement point	5.000	8.000	5.750
Mean diameter	0.200	0.224	0.206
Volume pile	0.314	0.631	0.383
Piles per m3	3.183	2	2.609

Is to the calculation factors tab

Volume per pile (m3)	Volume sum (m3)
0.094	5.8
0.151	24.6
0.177	45.1
0.191	30.5
0.220	7.7
0.321	75.9
0.380	30.4
0.066	1.1
0.138	3.9
0.151	3.5
0.177	1.1
0.268	9.9
0.075	1.1
0.127	1.0
0.151	2.1
0.163	0.7
0.191	2.9
0.285	6.3
0.340	7.5
0.314	13.2
0.631	68.1
0.383	46.8
0.570	2.3
0.336	15.5
0.631	2.5
0.191	0.8
0.285	1.1

11	11	11	11
0.800	0.8	0.8	0.8
10.5	11.5	14.5	16.0
5.250	5.75	7.25	8
0	0.156	0.168	0.174
0.191	0.220	0.321	0.380
5.248	4.549	3.111	2.628

16.000	16.000	16.000	11.000
0.8	0.8	0.8	0.8
15.0	10.5	16.0	10.5
7.5	5.25	8	5.25
0.22	0.202	0.224	0.152
0.570	0.336	0.631	0.191
1.754	2.972	1.586	5.248

11	11	11	11	11	11
0.8	0.8	0.8	0.8	0.8	0.8
5.0	8.5	9.0	10.0	13.0	5.5
2.5	4.25	4.5	5	6.5	2.75
0.13	0.144	0.146	0.15	0.162	0.132
0.066	0.138	0.151	0.177	0.268	0.075
15.068	7.224	6.637	5.659	3.732	13.286

11.000
0.8
13.5
6.75
0.164
0.285
3.507

11	11	11	11	11	11
0.8	0.8	0.8	0.8	0.8	0.8
8.0	9.0	9.5	10.5	13.5	15.0
4	4.5	4.75	5.25	6.75	7.5
0.142	0.146	0.148	0.152	0.164	0.17
0.127	0.151	0.163	0.191	0.285	0.340
7.893	6.637	6.119	5.248	3.507	2.937

Total emissions	18.21 tCO2
emissions forestry	2.89 tCO2
emissions transport	2.85 tCO2
emissions piling	5.74 tCO2
AGB emissions	6.72 tCO2

Emissions forestry

Wood production emissions: 11.1 kgCO2/m3 <https://www.storaenso.com/-/med>

Emission pile driving

	5737 kgCO2
Hours per day	8 hr/day
Piles per day	110 piles/day
Piles project	1199 piles
Days of work	11 5.5 days
w2w emissions (diesel)	3.2 kgCo2/l
2t2 bensine	2.7 kgCo2/l

Distance 47.2 km Zijdepark 10, Ouderk adJ
Hoge Noordweg 27c Naaldwij

Per project

Lowboy	
Lowyboy per km	0.5 l/km
Diesel usage	47.2 l 302.08 kgCO2

Transport Personnel

Bus per km	0.07 /km
Amount of days	6 days
Bensin usage	6.293333333 l 103.46 kgCO2

Generator AC

Diesel per hour	4 diesel/hour
Per day	32 l/day 1116.16 kgCO2

Chainsaw

Petrol usage	1 l/u
Hours per day	1 hr/day
Usage per day	1 hr/day 29.87 kgCO2

Emissions Pile driving

Piles per hour	13.75 piles/hr
Pile driver	15 diesel/hr
Diesel per pile	1.09 diesel/pile 4,186 kg/CO2
Amount of machines	2 machines

Above ground biomass for

surface site	55,000	m2 removed grassland
surface site	5.5	hectare
Average Above Ground Biom	1.222	tCO2/ha
compensation for AGB	6.72	tCO2

[ia/documents/download-center/certificates/wood-products-approvals-and-certificates/epd/stora-enso-epd-kvh-](#)

Transport emission 2854 kgCO2

Manhay distance	293 km	Hoge Noordweg 27c Naaldwijk
Empty outward trip	1.5 km	
Total	439.5 km	
Usage truck	3.45 km/l	
Usage diesel	127 l/rit	
Amount per trip	38 m ³	
Trips	6.9	
Trip rounded	7.0	
Total usage	892 l diesel	

fixed values
calculated fields
variable Rene
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fixed transport

Total emissions	5.40 tCO2
emissions forestry	1.67 tCO2
emissions transport	1.63 tCO2
emissions piling	1.82 tCO2
AGB emissions	0.28 tCO2

Emissions forestry

Wood production emissions: 11.1 kgCO2/m3 <https://www.storaenso.com/-/med>

Emission pile driving

	1822 kgCO2
Hours per day	8 hr/day
Piles per day	110 piles/day
Piles project	334 piles
Days of work	3 1.5 days
w2w emissions (diesel)	3.2 kgCo2/l
2t2 bensine	2.7 kgCo2/l

Distance 47.2 km Zijdepark 10, Ouderk adIJ
Hoge Noordweg 27c Naaldwij

Transport Machines

Lowboy	
Lowyboy per km	0.5 l/km
Diesel usage	47.2 l 302 kgCO2

Transport Personnel

Bus per km	0.07 /km
Amount of days	2 days
Bensin usage	6.293333333 l 34 kgCO2

Generator AC

Diesel per hour	4 diesel/hour
Per day	32 l/day 311 kgCO2

Chainsaw

Petrol usage	1 l/u
Hours per day	1 hr/day
Usage per day	1 hr/day 8 kgCO2

Emissions Pile driving

Piles per hour	13.75 piles/hr
Pile driver	15.00 diesel/hr
Diesel per pile	1.09 diesel/pile 1,166 kg/CO2
Amount of machines	2 machines

Above ground biomass for

surface site	2,300	m2 removed grassland
surface site	0.23	hectare
Average Above Ground Biom	1.22	tCO2/ha
compensation for AGB	0.28	tCO2

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Transport emission 1631 kgCO2

Manhay distance	293 km	Hoge Noordweg 27c Naaldwijk
Empty outward trip	1.5 km	
Total	439.5 km	
Usage truck	3 km/l	
Usage diesel	127 l/rit	
Amount per trip	38 m ³	
Trips	4.0	
Trip rounded	4.0	
Total usage	510 l diesel	

fixed values
calculated fields
variable Rene
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