Natuurmonumenten

Interreg
North-West Europe
Care-Peat
European Regional Development Fund

Development plan for the excavation of turf ponds in De Wieden

advies & ingenieursbureau

1. Introduction to the excavation of new turf ponds

The pilot covers the excavation of approximately 8 to 10 hectares of new turf ponds in De Wieden. During this phase, innovative and feasible, affordable, and technically implementable new procedures and potential markets are being studied and elaborated for the excavated materials.

The pilot will be implemented in accordance with the following variant: Land recovery – foreshores (sub-variant with marshy woodland). Natuurmonumenten (NM) accepts the need of the province to gain further experience and acquire knowledge about the implementation method, costs, positive and negative side effects, planning and the sale of the excavated materials.

NM's pilot includes using the excavated materials underwater in the Beulakerwijde lake. By using these materials underwater, NM will prevent the decomposition of the excavated materials in which CO_2 is released. Furthermore, the excavation of new turf ponds is intended to set hydrosere in motion in which atmospheric CO_2 is captured for long periods, and hence carbon storage is increased.

2. Description of the area

De Wieden is a Natura 2000 area (figure 2.1) and an extensive ombrotrophic bog with lakes and canals, and wet grasslands, wet heathlands, floating mats, swamp sawgrass marshes, reed lands, and marshy woodland. De Wieden covers an area 9,000 hectares which makes it the largest fen in our country.
A large part of it consists of depleted turf ponds. Almost all successional stages from open water to oligotrophic bog vegetation and bog woodland are present, but the young successional stages are lacking or are under pressure (see also paragraph 2.3).

In this project, new turf ponds will be excavated to set hydrosere in motion again (see paragraph 2.4). The area in which measures will be taken for the pilot is located to the south of Dwarsgracht (see figure 2.1).

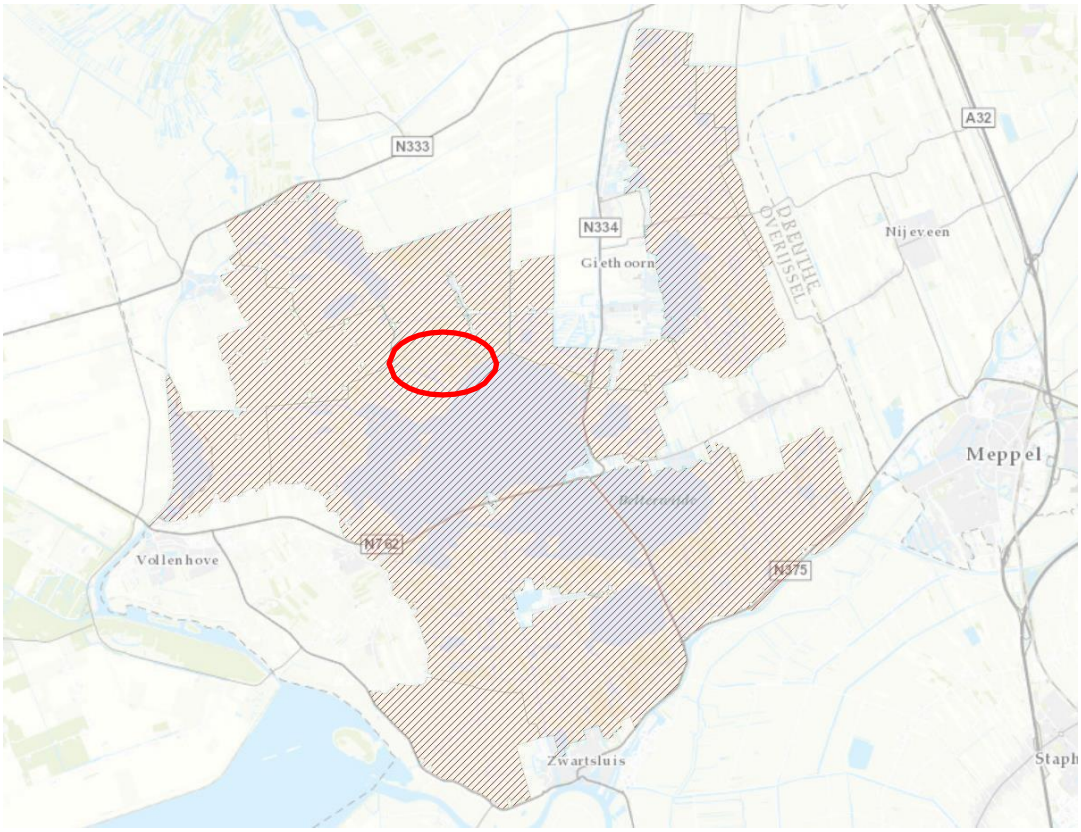

Figure 2.1 Outline map of De Wieden (highlighted in red) Natura 2000 area, the area in which measures will be taken is roughly indicated within the red circle (source for background: PDOK).

2.1 Aim of the turf ponds

The aim of excavating new turf ponds is to create conditions for new successional stages of hydrosere to come into being with accompanying vegetation (and habitat types). Extension targets apply to the area for most habitat types in the hydrosere, (see paragraph 2.2).

The excavation of new turf ponds will be particularly favourable in the short term for the expansion of the geographic range limit of aquatic and semi-aquatic habitat types such as waters rich in characeae (H3140), lakes containing water soldier (stratiotes aloides) and pondweeds (H3150) and swamp sawgrass marshes (H7210). However, the main aim is to set hydrosene in motion once again and to create new layers of moss (floating mats and spaghnum-dominated reedbeds (H7140)) which are also necessary to maintain the succession in later stages (Province of Overijssel 2017a). The banks of turf ponds are also important for the large copper butterfly.

In the Natura 2000 De Wieden & Weeribben working document, an initial management planning period of 10 hectares per year was taken as a starting point for De Wieden (Province of Overijssel 2009). In the Dutch government's Integrated Approach to Nitrogen (PAS) area analysis, these areas have been enlarged to compensate for the fact that little has been done in recent years, and in anticipation of the final decisions. Each PAS period provides for the excavation of 90 hectares of turf ponds in De Wieden. This amounts to a total of 270 hectares of new turf ponds in De Wieden. The pilot gets this off to a start.

2.2 Aim of the foreshore

In order to use make good use in the region of the excavated materials from the turf ponds, an underwater storage area will be created. This storage area will be finished in the form of a foreshore. The creation of a foreshore serves various aims:

- The bank of the Beulakerwijde lake is impacted by water and wind and subject to erosion. The banks are eroding, which is causing the existing nature, such as reed lands and marshy woodlands, to gradually change into open water. One consequence of bank erosion is that the water becomes turbid, peat particles start to float in the water or sink and then move again under the influence of strong wind. Since the storage area is being created in the form of a foreshore, the underlying land will be protected against wave erosion from the Beulakerwijde lake. Wave erosion is a serious threat to banks, the hinterland and the turf ponds, habitats and habitat types present in them.
- This allows materials to be transported across a relatively short distance using existing forms of waterway transport so as to avoid unnecessary lorry journeys in the ecological area and damage or allows this to be kept to a minimum.
- The foreshore and the materials introduced into it create a dampening effect on the water dynamics. This offers space and possibilities for the development of marsh vegetation that form a habitat for marsh birds (such as the N2000-varieties bittern and sedge warbler). Expansion of the habitat for marsh birds is one of the tasks in the Natura 2000 management plan. Although the foreshore is not part of the marsh development specified in the management plan, the foreshore does complement this.
- The underwater application enables CO_2 emissions that are usually released when excavating turf ponds and processing excavated materials (for instance, into garden soil) to be avoided or curtailed. In this way, the creation of the foreshore also contributes to the climate target which again indirectly plays an active part in the Natura 2000 targets

3. Procedure

3.1 Location of the turf ponds

The new turf ponds will be excavated in four sublocations within De Wieden, situated to the south and south-west of Dwarsgracht (see figure 2.2). The locations of the turf ponds have been selected on the basis of:

- Accessibility: access ditches need to be widened to a limited extent for access by equipment.
- Typical locations in relation to the pilot: several locations near the foreshore and several that are further away.
- Position: is not directly adjacent to the bank (in connection with collapse of bank area).
- Surface: taken together, the locations offer sufficient space for a maximum of 10 hectares of turf ponds.
- The parcels consist of marshy woodland and there are no habitat types within the selected locations. *

** Further studies will be carried out into the presence of qualifying habitat types in the selected turf pond locations (as per email dated 21-03-2019 from the Province of Overijssel). If it emerges from the studies that there are qualifying habitat types within the selected locations (figure 2.2), an alternative location will be chosen for the excavation of the turf ponds (see also H3.1.2.).*

3.2 Location of the foreshore

The foreshore will be created in an area that is north-west of the Beulakerwijde lake (see figure 2.2). This location was chosen for the following reasons:

- The location is fully owned by NM.
- The location is a priority for shore protection.
- There are no habitat types within the location and there are no habitat types adjacent the location.
- The distance to the turf pond locations is relatively short, which limits the distance required for transporting the excavated materials during the excavation of the turf ponds.
- The location does not present any obstruction to shipping movements.

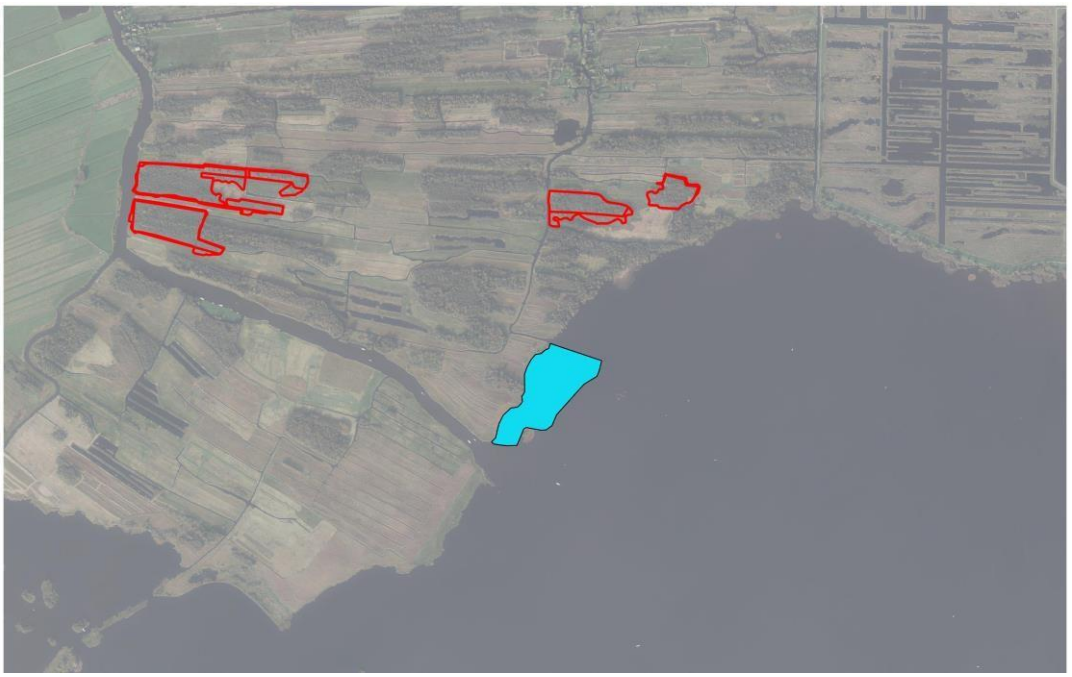

Figure 2.2 The four locations for the new turf ponds to be excavated (outlined in red) and the foreshore (blue). Source: NM.

3.3 Design of the turf ponds

The new turf ponds will be created by digging open the old turf ponds again. The old turf ponds have been subject to hydrosene over the years to such an extent that a marshy woodland has formed. The existing peat dikes will be maintained and restored where necessary. Steep slopes will be created to set hydrosene in motion in the newly excavated turf ponds (Weijs & van Tooren 2014).

The new turf ponds will be created with the following dimensions:
Minimum width: 15 metres; maximum width: 30 metres.
Minimum length: 30 metres; maximum length: 100 metres.
The depth will vary, and the maximum depth will be 80 cm (sandy ground will not be excavated).

3.4 Procedure for excavating the turf ponds

A specific procedure has been developed for the excavation and transportation of vegetation growth (with or without wooded areas) that uses a shredder, a hydraulic excavator (JCB) and a floating conveyor pipeline (high-pressure line).

The wooded areas will initially be removed at the turf pond location. A JCB fitted with a sorting grapple will be used to remove the wooded areas. The trees will be 'grabbed' using the grapple and then removed from the vegetation. Large trees will be broken, or large branches will be removed. The trees, branches and stumps will then be inserted into a shredder using a JCB. The excavated materials will be temporarily put aside, and then pumped away with the excavated materials from the turf ponds using the floating conveyor pipeline.

The turf pond will then be excavated using a JCB. The materials, moss and vegetation, dredge, and woodchips will be pumped away. The rough material will be introduced from the top, and water and fine dredge will be drawn from the bottom. The water is needed for pumping away the aggregate mass. Pumping water and fine dredge also limits the turbidity of the surface water at the excavation location. The material will be pumped to the foreshore using a floating conveyor pipeline, which may be used in combination with an intermediary station.

The conveyor pipelines will be laid against the banks along the water channels. So as to not obstruct transport by water (recreation, management, etc.), an inverted siphon will be used in places where the transport line crosses a main water channel. The use of conveyor pipelines removes the need for boat transport with collection barges to discharge the excavated materials. Where possible, the noise of the machines will be limited as far as possible by using appropriate silencers and by insulating the machines. This method keeps nuisance and damage in the region to a minimum.

Narrow water channels will be enlarged to transport the materials. Access ditches will be dug between the turf pond locations. The materials released when excavating an access ditch will be temporarily put aside. The materials will be discharged during the excavation phase using the conveyor pipeline.

3.5 Design of the foreshore

For the underwater usage of the excavated materials, a boundary structure (retaining dike) will be created to keep the material in place. The boundary structure will be constructed between the existing banks and the open water. The structure will be bounded at both ends by the existing banks. This creates an enclosed space where the materials released during the excavation of the turf ponds can be processed. It will be completed at the end of

the work, and the storage area will serve as a foreshore. A boundary structure measuring approximately 900 metres will be required to secure the material from approximately 8 to 10 hectares of turf ponds. The surface of the foreshore has an area of approximately 5.5 hectares.

3.6 Procedure for the foreshore

For the construction of the boundary structure, a screen made from geotextile and poles will first be fitted. A sandbank will be positioned against the outer side (the side of the lake) by excavating the inner side, at a good distance from the poles. The sand will be deposited at a gradient of approximately 1:4. To create sufficient counter-pressure on the inner side, sand will also be placed against the screen on the inner side. The outside of the sandbank will then be covered with a tarpaulin and faggots. Lastly, the tarpaulin and faggots will be covered with rubble.

Water will be used when transporting the peaty materials with the floating conveyor pipeline to ensure that the excavated materials are sufficiently liquified. This processing water must be able to leave the foreshore free from peaty material in order to avoid turbidity in the surrounding water in the Beulakerwijde lake and the outlet waterway. To make this possible, the foreshore will be made larger than is required for storing the quantity of peaty materials excavated. This extra space will also be used during the final phase of filling the foreshore to give the processing water sufficient time to settle and restrict the flow rate of the processing water. In doing this, an outlet opening will be created in the form of a filter in the geotextile and faggots. Experience from previous projects has shown that this method does not cause the storage water to become turbid.