

Dismantling of Lines 1201 and 1202

Reforestation plan for the North Wall

December 7th , 2020

Signatures

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Reforestation plan – North Wall, Kahnawake

1 Context and objectives

The dismantling of two towers and the conductors of circuits 1201 and 1202 on the North Wall has an impact on the forest surrounding the towers and the roads in the area. A little bit less than 2 hectares of forest will have to be cleared to prepare work areas large enough to accommodate and assemble a large crane and access roads for this crane to reach these towers. This reforestation plan is part of a larger restoration plan that has the objective of giving back the most natural characteristics possible to the area once Hydro-Québec is done with the project.

2 Proposed sites and concerned areas

The proposed sites are the ones that have to be cleared for the project except open marshes and areas invaded by phragmite. The figure 1 shows, outlined in green and blue, the reforestation areas. The green areas are well drained and forested wetlands are in blue. The darker blue shades indicates wetlands. The areas outlined in pink are the work areas located in open wetlands or invaded by phragmite which are not included in the reforestation plan.



Figure 1: Reforestation area vs work areas

The area concerned by the reforestation plan is 1.85 hectares. Since there is an existing road that will still be there after the project, an area of 0.25 hectares is subtracted (500m long by 5m width). That road will be enlarged for the dismantlement works but it will be rehabilitated to its original width and state. Therefore, all the enlarged areas for the existing access road will be reforested. Of course all the new access roads will be dismantled and reforested also. The resulting area is 1.6 hectares divided between well drained terrain (1.5 ha) and forested wetlands (0.1 ha). The exact areas to be reforested will be established after the clearing, the dismantling of the towers and the restauration of the work areas are completed.

3 Forest assessment results

To have a more precise portrait of the forest affected by the project, a forest inventory was conducted on October 16th 2020. Eight sample plots were implanted with a factor 2 forest prism (see figure 1 for their location). The diameter at breast height (DBH), the specie and the vigor of all the commercial trees (DBH > 9,1cm) within the plots were taken. Most of the plots were in forests that had been disturbed in the past, probably due to the construction of the power lines and the presence of the road. In order to have an idea of the natural characteristics of the local forest, plot #4 was placed in a seemingly untouched part of the area, outside the work areas. Two tree species were found in that plot that wasn't present in all other plots. Black cherry and American Hop-Hornbeam. As for the plot #7, it was placed in a wetland invaded by phragmite. It was not representative of what we want to achieve in this reforestation plan although it had to be taken to have an idea of the areas touched by the work areas. Thus, to determine the objectives for this reforestation plan, plot #7 was taken out of the compilations. Table 1 shows the result of the compilation, per species and hectare, of the remaining 7 plots in terms of basal area, net volume and number of stems.

Mean value per species	Basal Area (m2/ha)	Volume (m3/ha)	Nb of stems/ha
Black Cherry	0,3	1	19
Bur Oak	1,1	10	14
Red Oak	0,9	7	17
Red Maple	1,7	12	52
White Ash	5,4	43	139
Black Ash	4,0	24	235
American Elm	1,7	16	110
American Hop-Hornbeam	0,3	1	25
Cottonwood	0,3	3	1
Trembling Aspen	1,4	11	53
American Linden	4,3	36	77
Total	21,4	164	741

Table 1: Compilation of 7 sample plots

The basal area varies between the sample plots from 14 to 30 m2/ha, the volume from 138 to 176 m3/ha and the number of stems, from 219 to 1731 stems/ha.

4 Reforestation plan

4.1 Species considerations

From 3 to 5 tree species will be planted in the well-drained areas. As for the wetlands, the objective is to plant 2-3 species. The table 1 serves as an inspiration for the choice of the tree species.

The two species of Ash are the most represented species in most of the plots. Almost all those trees were dead (or soon to be...) because of the Emerald Ash borer. This insect is presently decimating most of the Ash trees in southern Québec and must not be chosen in a reforestation plan.

The other species that should not be part of this plan are the Cottonwood and the trembling Aspen, part of the poplar family. These are pioneer species and the objective here is to recreate a natural forest the closest as possible to its climax stage.

For the well-drained areas, the choice of species to plant is quite wide: **Black cherry, Oaks, Maples, Elm, Hornbeam and Linden** can all be used. As for the forested wetlands, it is more limited. Since the Black Ash cannot be used, the red maple and, to a lesser extent, the American elm are the only species present in our inventory that can be planted in these areas. **Silver maple and the Swamp White Oak** could add to the list.

The exact list of the species that will be planted is going to be determined in collaboration with the Kahnawake Environment Protection Office (KEPO). Other species like Shagbark Hickory or Wild Plum could also be added to the list as long as they are indigenous and depending on the availability of those species in the nurseries.

4.2 Seedling size and plantation techniques

The seedlings that will be planted are the same size used in forest management. They are called “strong size seedling”, “plant de forte dimension (PFD)” in French. Their height varies from 45 to 60 cm. The seedlings can be delivered with or without a soil core. They can be planted by a planter with a planting shovel. A planter carries 2 to 3 big pouches filled with seedlings on his shoulders and plants them at a more or less constant distance to respect the plantation density target. The planter will choose the best microsite for each seedling.

4.2 Density

The inventory conducted shows that the density of the forest varies a lot (from 219 to 1731 stems/ha). The denser plots were in relatively young and disturbed areas and are not representative of a forest at a climax stage. The plot #4 is the most representative of that stage and the density is 624 stems/ha. Not so far from the mean value of 741 stems/ha of our assessment. These are normal figures in deciduous forests of southern Québec.

Since we have to expect some mortality in this project, it is proposed that we plant at a density of **1000 stems/ha**. This would permit a mortality rate of 25% and there would still be enough trees to reach the natural density. Therefore the number of tree seedlings would be of **1600 trees**. They would be planted at a mean **distance of about 3.5 m**.

4.3 Plantation maintenance and schedule

It is planned that the plantation will be monitored for a period of three years including the year of the plantation. If the mortality rate exceeds 25%, fill planting is also possible at the end of year 2. Table 2 describes the schedule of silvicultural scenario of this reforestation plan.

Year	Period of the year	Works
1	May	Planting
	July-August	Maintenance (thinning/clearing of competitive vegetation)
2	June	Maintenance (thinning/clearing of competitive vegetation)
	August-September	Maintenance (thinning/clearing of competitive vegetation)
	September	Mortality rate inventory
	September	Fill planting (if necessary)
3	June	Maintenance (thinning/clearing of competitive vegetation)
	August-September	Maintenance (thinning/clearing of competitive vegetation)

Table 2: Silvicultural scenario

The schedule is based on the scenario that we will be able to plant in the spring. It is important that all the restauration works on the field have been completed before the planting can begin. If it not possible

in spring 2021, the plantation could be delayed to spring 2022. It is also possible to plant in the fall of 2021 but planting these kinds of seedling in that season is not optimal for the mortality rate. Finally, the maintenance works are to be done manually with a manual brush cutter. No herbicides will be used.

5 Conclusion

The final planting areas and species will be determined jointly between Hydro Quebec and KEPO. This reforestation plan will have to be completed with the precise list of tree species available and their amount by species. This will come during the winter of 2021. As for the final areas to be planted, it is at the beginning of spring 2021 that we will have the most accurate information.