Amherst Point 1: Supplemental Information

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Method

Restoration

The main component of the restoration project will be a managed dyke realignment. To reintroduce tidal influence to this impoundment, a series of dyke breaches will allow tidal hydrology reconnection. The free flow of tidal water will provide conditions for salt marsh restoration to occur. Three attributes are critical to restoration success in a macro-tidal environment. Reconnection of tidal channels, sediment supply and sufficient marsh elevation. Presence of a halophytic vegetation seedbank are also important to begin marsh colonization.

All work will occur outside of the sensitive wildlife lifecycle period. Before any earthworks will commence, the project will undergo a drawdown to remove as much water as possible from the site.

There are several factors considered in planning of breaches. Geospatial extent, tidal frame, hydrology, tidal channels, water velocity and current, sediment accretion rates, subsidence rates and more. A series of breaches are proposed to allow connection of tidal hydrodynamics. These breaches will be designed with capacity to minimize excessive erosion. Breaches will optimize sediment flocculation rates to increase sediment accretion rates. Dyke material removed to excavate the breach (if not needed for dyke topping in another location) will be placed inside the confines of the project area and tamped to reduce the potential for erosion.

Reconnection of the tidal channel is also important to re-establish dynamic equilibrium and increase soil solidification rates on the marsh. The water control structure that regulates water levels on the project will be removed and the tidal channel will be left open. All infrastructure will be loaded, removed from the site and disposed of appropriately.

The southwest cross dyke separates the freshwater impoundment from the adjacent agriculture marshland. The land adjacent the project is owned by DUC. To reduce liability, DUC proposes the cross-dyke realignment occur on DUC owned lands. The construction of a new dyke over DUC property would bring the following value to the project:

- Adjacent landowner would acquire a new dyke that is designed and built to modern internal specifications factoring sea level rise.
- Adjacent landowner would retain a large tract of agricultural land of which the newly constructed dyke would be a part.
- The realigned dyke would be less susceptible to erosion, as the protective foreshore would be increased.
- The angle at which the dyke transitions from the shoreline to the upland is greatly reduced. An angle less than 90° (74°) would result if the existing cross-dyke on federal lands was upgraded and used. A newly realigned dyke would see an angle of 100-120°, depending on the decided location. The reduced angle exposed to the tide in conjunction with a greater foreshore area will enhance structural integrity and enhance longevity.
- A realigned dyke as conceptualised would save 200-400 m of dyke management requirement.

- ECCC will not be accountable for the dyke as the footprint will not be on ECCC lands.
- DUC may transfer the lands not being used for agriculture to ECCC, ultimately adding salt marsh to the existing National Wildlife Area in John Lusby Marsh.

Please see attached concept sketch for reference (No. AP1C001).

In summary, the northeast and northwest dyke will be breached according to informed design. The tidal channel running parallel the northeast dyke will be reconnected. It is to be determined where the dyke realignment will occur. Pending this decision, there is potential for ECCC to acquire additional lands and expand the boundary of the John Lusby Marsh NWA.

Monitoring Program

Ecological and hydro geomorphological monitoring will occur on both the restoration site and the reference site adjacent the project. The reference site is similar in spatial extent and located immediately north of the restoration site.

The monitoring protocol will use a suite of various tidal wetland indicators to gauge the ecosystem response to the restoration. Indicators include geospatial attributes, hydrology, soils, sediment accretion and vegetation, consistent with other tidal wetland restoration projects conducted to date.

Project Duration and Frequency of Visits

DUC anticipates this project will span over 3-4 months. Non-invasive work, such as baseline monitoring data collection, field topographic surveys and other planning activities will likely take place within 1-2 weeks of time. The anticipated timeline for earthworks is likely to occur within 1-2 weeks of time as well.

Frequency of visits will depend on worker schedules, but will likely be clumped by task (i.e. monitoring, surveys etc.). One visit a week is anticipated from the beginning of the project until earthwork begins. Earthworks will be focused on specific days to complete the job quickly in attempt to minimize the time heavy machinery is on site.

Techniques, Tools and Machinery

Monitoring

DUC has existing relations with a number of local qualified research labs that specialize in coastal restoration projects. Our science staff person works with specialists and students in all of the Maritime Provinces to produce applicable publications that inform future projects.

To conduct baseline monitoring, specific tools and instruments will need to be used. The most intensive being the installation of a Feldspar marker horizon. However, this technique will only be conducted if required for baseline data. No geological or biological collections will be required.

Post-restoration monitoring will require routine visits to the site in subsequent years. However, this can be timed to understand the vegetation establishment, while avoiding sensitive bird breeding and other critical timing issues related to wildlife.

Earthworks

A 20 ton or larger excavator will be employed to remove dyke material and the water control structure. A tandem truck may also be used to transport dyke material and debris offsite as required. Machinery will work on the existing dyke footprint only.

Follow-ups

Monitoring efforts will be ongoing post-restoration construction to ensure the project is responding as anticipated. Once the schedule of monitoring visits is finalized, this information will be provided to Environment and Climate Change Canada.

Environmental Impact Mitigation

All earthwork will occur outside biologically sensitive times (Aug 15-March 30)

All successful earthworks contractors are required to work under Environmental Protection Guidelines outlined in the contract. This includes, but not limited to, site set-up and decommissioning, a sediment and erosion control plan, hazardous materials management, work adjacent to watercourses, site drainage.

All federal and provincial environmental permits will be attained and all stipulations adhered to.

A species at risk survey and report has been prepared. It indicates absence of federally recognized species at risk.

Table 1. Amherst Point salt marsh restoration monitoring program. (Annual application indicated by B – both sites, AP – Amherst Point, R – Amherst Point Reference Site)

Indicator	Parameters	Sampling Method	Monitoring Year				
			Post				
			Pre (2019)	1	2	3	5
Geospatial	Marsh surface elevation	Digital Elevation Model (DEM)	B				
Hydrology	Tidal signal	Automated water level logger	AP			AP	AP
	Suspended sediment concentration	Bottle sample	AP	AP		AP	AP
Sediment	Sediment elevation	Rod Surface Elevation Tables (RSET)	B	B	B	B	B
	Sediment accretion	Marker horizons*	B	B	B	B	B
Vegetation	Composition	Point Intercept method (1 m^2 plots)	B	B	B	B	B
	Abundance/distribution						
	Height						
	Habitat map	Aerial photography	B	AP	AP		AP

*This parameter will be delivered if required by the regulatory bodies.

Appendix

Photos July 2019.

Photo 1. Amherst Point 1 perspective west.

Photo 2. Water control structure outflow.

Photo 3. Significant erosion on Amherst Point 1 outer dyke (northeast dyke).

Photo 4. Northwest dyke in the background, perspective from the midpoint of the south cross-dyke.