Cost estimates Assumption
±50% cost estimate
Use rates from original contract as initial basis for cost estimate
Used areas to be capped or cleared for scenario A and Scenario B from files provided by IEC.
Assumed up to 10% of project time will be delays for environmental/archeological and weather. Allow in costing, schedule and resourcing.
Used a typical road cross-section to determine cost per lineal meter for road upgrade (3m^3 per meter)
Road construction within the work area is included in the excavation costs.
Use Nalcor rates as base cost (Civil works Rates and Earthwork Rates
Check with Spon's Civil Engineering and Highway Works Price Book used to estimate basic earthworks
All equipment will have to be remobilized to site
Quantities calculated for El39 masl.
Temporary camp will be required (~75 person)
Contractor will require a compound closer to work area
Road maintenance will be required for the duration of the work (graders and haul trucks), Scenario B only
Excavation in winter will not be feasible to limit excavation depth to just A and O horizon (1.5m depth versus 0.2m)
$90-$160 accommodation and food per day per person
5-8% of CAPEX for engineering support and supervision
Mobilization based on 10% to 15% of CAPEX

Schedule Assumption
Start in August/Sept 2018
Complete by April 2019
Increase equipment to meet schedule
Assumed high LD's for not meeting schedule
Assumed up to 15% of project time will be delays for environmental/archeological and weather. Allow in costing, schedule and resourcing.
0.2ha/day to 1ha/day of wetland covering– average 0.5 ha. Use 0.5ha/shift for costing and scheduling purposes. Scenario A

GIS data Assumption
All provided mapped environmental GIS features shall be field verified
Only these mapped inputs were considered for conceptual modelling, planning, and cost calculations
Disposal locations, roads, crossings etc. are conceptual and as needed and to be field verified

Construction (methods and materials) Assumption
All organics are to be removed from cleared areas up to elevation 39 masl. Scenario B
Disposal of organics shall be above the FSL (39 masl). Scenario B
Organic soil pushed in windrows to expose borrow material for wetland covering. Wetland cover material to remain below an elevation of 39 masl. Wetland cover material thickness assumed to be 0.5m
Use largest equipment feasible to reduce rate/m^3 moved
Use forest roads manual as guidance for roads
Assumed haulage by 3 axle articulated trucks
200 m max push with a dozer, ideal 100-150m
Existing roads from previous phases to be used. Water crossings from previous phases as still in place
Roads to min 10 m wide with turning areas and passing areas if required. Allow for 50% of roads to be widened to 15m for two way traffic by CAT 720 (or equivalent) articulated 3 axle dump trucks. Scenario B
Roads to be less than 8% slope wherever possible minimum road is 2% if possible abs. max 12% slope
Excavate material less than 1.5m with dozer and loader
Excavate with backhoe of any size bigger than 400mm
Transport of waste to be less than 5 km, aim for 3 km Frozen ground containing organics assumed to be excavated to 1.5 m (over excavation due to frozen ground)

Construction (methods and materials) Assumption
In non-frozen ground excavated material to be a minimum of 0.5 m - limitation of equipment, operators conducting rapid excavation and surface obstructions/features (e.g. root balls).
Wetland assumed to be excavated to 2.2 m – 0.3 m provided in AMEC ELC assessment but an allowance has been made for an average assuming deeper deposits
Follow slope contours where possible - Follow contours for roads
Use forest roads manual
Use mineral material from waste dump excavations and borrows near roads to build roads and earthworks
Only use geogrids to provide road support if required
All equipment will have to be remobilized to site
Day work only, work each shift has 10 hrs operation (assume vehicle 90% utilisation)

Geotechnical stability Assumption
Sensitive clays - avoid changes in stresses
Avoid steep slopes
Avoid traffic
Follow contours for roads
Any unsuitable/soft ground, cracking, slope instability, etc. conditions encountered should be reported to the project geotechnical engineer during the clearing operation.

Soil and vegetation to be removed (soils containing carbon) Assumption
Any existing natural drainage should be protected.
ELCs such as Water, Gravel Bar, Anthropogenic and Riparian areas are not considered for the removal operation.
Environmental permit and archaeological permit assessments shall be completed prior to the operation
For budgeting purpose, excavation thickness in frozen ground to remove organic soil are as follows when : • Black Spruce/Feathermoss Forest – 1.5 m • Black Spruce/Lichen Woodland – 1.5 m • Black Spruce/Sphagnum Woodland – 1.5 m • Fir-White Spruce Forest – 1.5 m • Hardwood Forest – 1.5 m • Mixed wood Forest – 1.5 m • Riparian – 1.0 m • Spruce Fir/Feathermoss Forest – 1.5 m • Wetland – 2.2 m
For budgeting purpose, excavation thickness in non-frozen ground to remove organic soil are as follows when : • Black Spruce/Feathermoss Forest – 0.5 m • Black Spruce/Lichen Woodland – 0.5 m • Black Spruce/Sphagnum Woodland – 0.5 m • Fir-White Spruce Forest – 0.5 m • Hardwood Forest – 0.5 m • Mixed wood Forest – 0.5 m • Riparian – 0.0 m • Spruce Fir/Feathermoss Forest – 0.5 m • Wetland – 2.2 m

Water management Assumption
Surface drainage measures will be temporary (less than one year sept 2018 to Apr 2019)
Drains will be constructed once roads are and clearance is completed
No pipes/culverts to be left in place after completion of excavation in an area
Sedimentation ponds are temporary to deal with freshet and until reservoir fill
Sedimentation ponds every 1.5km minimum (range between 1km 3km)

Resources Assumption
Assume new mobilization of equipment to site
Whatever is required can and will be mobilized
No aggregates available – or only what can be found on site
All materials used to build earthworks and roads will come from site except geosynthetics and culverts
Assumed up to 10% of project time will be delays for environmental/archeological and weather.
Allow in costing, schedule and resourcing.

Disposal Assumption
Excavate out disposal hole and cap with clay or sand mineral (above the FSL)– surcharge to compress organics
Outline design for storage – assume borrow and backfill and permitting achievable
Disposal areas to be within 3km of extraction point – possibly further if along river
Permits can be obtained for disposal of organics in time scales

Equipment estimates Assumption
Excavation crew (1 excavator, 1 dozer, and 4 trucks) can move 1320m^3/day
Road Construction crew (2 dozers, 1 excavator, 2 trucks and 1 grader) can construct 500m of road per day
General excavation crew (1 excavator, 4 trucks and 1 dozer) can mover 1320m^3/day
Road maintenance crew (6 graders, 2 excavators, 4 trucks)