APPENDIX VI. WETLAND CHARACTERISATION AND FUNCTIONAL ASSESSMENT FORMS

Wetland Characteristics. New Victoria Community Wind Project

WETLAND ID	WETLAND TYPE	LANDSCAPE POSITION	LANDFORM	WATER FLOW	SOIL TYPE	SURFACE HYDROLOGY	WETLAND BOUNDARY/BUFFER	DOMINANT VEGETATION			WATER INPUT OBSERVATIONS	POTENTIAL FOR FISH PRESENCE
								Herbs	Shrubs	Trees		
WL1	Mixed wood treed swamp	Terrene	Basin	Throughflow	1) Low decomposed organic - depth 15cm- over silty clay mineral- depth 10cm- over sandy silt mineral- depth >20 cm 2) >45cm depth 3) A1 Histosol and A11 Depleted below dark surface	1) High water table 2) Saturation 3) Water stained leaves	Moderate (50%) and low (50%) slope, natural buffer >100m	*Carex trisperma; Cornus canadensis*	*Larix laricina*	*Larix laricina; Acer rubrum*	Water provided by inlet which flows from wetland east of footprint	None in wetland; connected to Waterford Lake
WL2	Deciduous treed swamp	Terrene	Basin	Outflow (inferred)	1) Moderatley decomposed organic - depth 5cm- over loamy clay mineral- depth 25cm 2) 30cm depth 3) F3 Depleted matrix	1) High water table 2) Saturation 3) Water stained leaves 4) Sparsely vegetated concave surface	Moderate (20%) and low (80%) slope, natural buffer >100m	*Carex trisperma; Doellingeria umbellata*	*Acer rubrum*	*Acer rubrum*	Water provided by passive overland drainage from adjacent uplands	None in wetland
WL3.1	Complex: Deciduous treed swamp, Mixed wood treed swamp	Terrene	Slope	Outflow (inferred)	1) Moderatley decomposed organic - depth 8cm- over silty clay mineral- depth 30cm 2) 38cm depth 3) A11 Depleted below dark surface	1) High water table 2) Saturation 3) Water stained leaves 4) Sparsely vegetated concave surface	Moderate (20%) and low (80%) slope, natural buffer >100m	*Lycopus americanus; Doellingeria umbellata*	*Nemopanthus mucronatus; Acer rubrum; Betula papyrifera*	*Acer rubrum*	Water provided by passive overland drainage from adjacent uplands. Drains north to wetland habitat which continues off site.	None in wetland
WL3.2	Complex: Deciduous treed swamp, Mixed wood treed swamp	Terrene	Basin	Outflow (inferred)	1) Moderatley decomposed organic - depth 5cm- over silty clay mineral- depth 25cm 2) 30cm depth 3) F3 Depleted matrix	1) High water table 2) Saturation 3) Sparsely vegetated concave surface **Secondary indicators:** 4) Drainage patterns	Moderate (20%) and low (80%) slope, natural buffer >100m	*Juncus effusus**	*Acer rubrum*	*Acer rubrum, Picea mariana*		
WL4.1	Complex: Fresh water marsh, Shrub swamp	Terrene	Basin	Throughflow	1) Moderatley decomposed organic - depth 5cm- over sandy silt mineral- depth 20cm 2) 25cm depth 3) F3 Depleted matrix	1) High water table 2) Saturation	Low (100%) slope, natural buffer >100m on east margin and 10m on west margin	*Typha latifolia, Scirpus cyperinus, Vaccinium macrocarpon*	*Alnus incana*	*None*	Water provided by watercource inlet to the north (offsite).	None in wetland. Fish habitat limited to watercourse channel within wetland habitat
WL4.2	Complex:Fresh water marsh, Shrub swamp	Terrene	Basin	Throughflow	1) Moderatley decomposed organic - depth 5cm- over sandy silt mineral- depth 20cm 2) 25cm depth 3) F3 Depleted matrix	1) High water table 2) Saturation **Secondary indicators:** 3) Drainage patterns	Low (100%) slope, natural buffer >100m on east margin and 10m on west margin	*Carex trisperma, Lycopus americanus*	*Ilex verticillata*	*None*		
WL5	Open coniferous treed swamp	Terrene	Basin	Isolated	1) Moderatley decomposed organic - depth 3cm- over clay loam mineral- depth 20cm 2) 23cm depth 3) F3 Depleted matrix	1) High water table 2) Saturation 3) Sparsely vegetated concave surface	Moderate (40%) and low (60%) slope, natural buffer 20m to the north due to road and natural buffer >100m to the east,west and south	*Vaccinium macrocarpon, Myrica pensylvanicum*	*Larix laricina*	*Larix laricina*	Water provided by passive overland drainage from adjacent uplands; WL5 provides overland drainage to Wetland 4	None in wetland

APPENDIX C:	Nova Scotia Wetland Evaluation Technique Field Data Sheet (September 2011)									
Wetland Number:	2									
Project Name: New Victoria		Evaluator: MMD			GPS Coordinates: 720797 mE 5125106 mN					
PID: 15262371	Site Address:									
Sources and Dates of Mapping/Images:										
Evaluation Date: 28-Sep-15		Site Visit Date: 28-Sep-15								
Weather Conditions (past 48 hours): Warm, Dry										
Seasonal Weather Conditions: Warm, Dry										
SECTION ONE: WATERSHED CHARACTERISTICS										
1	Watershed Name (tertiary):	Size: km^2								
2	% Watershed Land Cover	For:	Nat:	Past/Hay:	Crop:	Urb/Com:	Road:	Other Dev:		
3	% Watershed WL Cover and by Class	Total: %	SM:	BO:	FE:	FM: 3	FS:	SS:	CP:	VP:
SF1	***Watershed condition***	***H***	***M***	***L***						
SF2	***Proportion of WL area in watershed & opportunity for floodwater detention***	***H***	***M***	***L***						
SECTION TWO: WETLAND CHARACTERISTICS										
Wetland Type: Complex - Treed swamp, shrub swamp		WL size: 0.05 hectares			Landform: Slope/Basin			Landscape Position: Outflow		
Water flow path: Outflow (presumed)		Wetland Origin:								
1	Water Regime	PF	SF	TF	**SS**	PS	RfT	IfT	AF	
2	# WL's within 30m project area	Total# 4	SM:	BO:	FE:	FM:	FS:	SS:	CP:	VP:
3	Is WL part of complex	Yes **X**	No							
4	% each wetland type in complex	SM:	BO:	FE:	FM:	FS: 80	SS: 20	CP:	VP:	
5	Is WL bordering or associated with a lake or pond?	bordering		within 100m		N/A		specify		
6	Standing water?	Yes	Avg Dep:		% Inundated:		No			
7	Inlet or Outlet (circle all that apply)?	Inlet	Outlet **X**		(Presumed)					
8	Adjacent Upland Land Use within 100m (%)	For: 100	Nat:	PasHay:	Crop:	UrbCm:	Road:	Other Dev:		
9	Are there stressors in WL or WL buffer area? Circle primary stressor(s).	DD__, CW__, WcS__, O/C__,EB__,DP__,F__,M__, ES__,NE__,DwP__,								
		M__,GC__,ATV__,DG__,EA__, R_**X**,Rr__,U/CD__,F_**X**_,FA__, other (specify):								
10	Hydrology Altered (circle all that apply)?	Ditching	Dams	Tiles	Culvert	Well	Diversion	Other Specify:		
SF3	***Rate the general wetland condition/integrity***	**H X**	**M**	**L**						
SECTION THREE: ADJACENT LAND CONDITION AND INTEGRITY										
1	Average width of adjacent naturalized buffer	100 meters								
2	Widths for water quality	H >15 **X**	M 8-15	L <8						
3	Widths for wildlife habitat	H >100 **X**	M 15-100	L <15						
4	Adjacent area vegetation condition (list % in each category)	H **X**	M	L						
5	Adjacent area diversity and structure (list % in each category)	H **X**	M	L						
6	Adjacent Upland Slope (list % in each category)	Steep	Mod 50	Gentle 50						
7	Adjacent land supports water quality	*Yes* **X**	*No*	Specify:						
8	Adjacent land supports wildlife habitat	*Yes* **X**	*No*	Specify:						
SF4	***Rate the overall condition and integrity land adjacent to wetland***	***H*** **X**	***M***	***L***	**is buffer required to maintain red flag functions of wetland? If yes if no**					
SECTION FOUR: DOCUMENTED IMPORTANT FEATURES										
SF5	***Is the WL a WSS?***	***Yes***	***No*** **X**							
SF6	***Does the WL support commercial/recreational fish/shellfish?***	***Yes***	***No*** **X**							
SF7	***Species of concern (Fed/Prov)? Specify.***	***End***	***Thr***	***SpC***	***Red***	***Yellow***	***S1***	***S2***	***S3***	***N/A*** **X**
SF8	***Wetland has conservation/compensation agreements/activity?***	***Yes***	***No*** **X**	specify:						
SF9	***Wetland is calcerous fen, black ash or cedar swamp?***	***Yes***	***No*** **X**							
SF10	***Within Drinking Water Protected Area (designated watershed/wellfield)***	***Yes***	***No*** **X**	specify:						
SF11	***WL within a floodplain and upstream of or within of a populated area?***	***Yes***	***No*** **X**							
SF12	***Fed/Prov/Municipal area of interest?***	***Yes***	***No*** **X**	specify:						
SECTION FIVE: HYDROLOGIC CONDITION AND INTEGRITY										
1	Is WL source of stream or headwater(wc order 1 or 2)	***Yes*** **X**	No	Specify: Extends offsite to mapped WC/WL.						
2	Is WL geographically isolated?	Yes	No **X**	Specify: Extends offsite.						

3	WL ability to maintain characteristic hydrologic regime	High **X**		Med		Low			
4	Water Storage Depth (list % in each class)	>30cm	15-30cm	up to 15cm		No ponding **X**			
5	Signs of surface water retention observed?	SW__cm, WSL **X** , WCD__, WM__cm, SM__cm, SD__, AD__, ID__, PMT__, AI__, BT__, AR__, Other:							
6	Describe observable/historical anthropogenic sediment delivery	Low **X**		Med		High			
7	Disturbance of WL soils	Low		Med **X**		High		Rutting	
8	Predominant soils adjacent to WL	Sand		Silt/loam **X**		Clay/bedrock			
9	Capacity of WL to alter/retard flows	High **X**		Med		Low			
10	Roughness coefficient for surface water flow path	High		Med		Low		**N/A X**	
11	Strormwater/Wastewater/Agricultural runoff detention	High		Med		Low **X**			
12	Water Source	Natural **X**		Mostly natural		Partly altered		Controlled	
13	Hydrology of tidal wetlands	Unrestricted		Reduced		Restricted		***N/A*** **X**	
14	Coastal storm surge	***Yes***	No **X**						
SF13	***WL hydrologic condition***	***Natural*** **X**	***Modified***		***Significantly Modified***				
SF14	***WL important for maintaining stream flow?***	***Yes*** **X**	***No***						
SF15	***WL ability to detain surface water***	***High*** **X**	***Med***	**Low**					
SECTION SIX: WATER QUALITY									
1	Strormwater/Wastewater/Agricultural runoff as water source?	High		Med		Low **X**			
2	Nutrients/sediments from surrounding land	High		Med		Low **X**			
3	Significant flood/stormwater attenuation	***Yes***	***No*** **X**						
4	Vegetation capacity to settle suspended sediments	High		Med **X**		Low			
5	WL type /landscape position holds/filters runoff?	***Yes*** **X**	***No***						
SF16	***Wetland improves water quality?***	***Yes*** **X**	***No***						
SF17	***Evidence of excess nutrient loading/contamination?***	***Low*** **X**	***Med***	***High***					
SF18	***WL contributes to water quality in downstream resources***	***High*** **X**	***Med***	***Low***					
SECTION SEVEN: GROUNDWATER INTERACTIONS									
1	Describe soils in wetland	Recharge		Discharge **X**					
2	Land use / run off in subwatershed upstream	Recharge **X**		Discharge					
3	Conditions of upland soils within 200m of wetland	Recharge		Discharge **X**					
4	Hydroperiod of wetland	Recharge		Discharge **X**					
5	Describe inlet/outlet configuration	Recharge **X**		Discharge					
6	Characterize topographic relief surrounding wetland	Recharge **X**		Discharge					
SF19	***WL serves as a recharge site***	***Yes***	***No*** **X**						
SF20	***WL serves as a discharge site***	***Yes***	***No*** **X**						
SECTION EIGHT: SHORELINE STABILIZATION AND INTEGRITY									
1	Wetland fringing ocean/estuary/lake/pond/river/stream?	***Yes***	No **X**	streamwidth >4m		streamwidth<4m		WB Exposed	WB Sheltered
2	% cover of rooted vegetation in shallow water zone	H >50%	M 10-50	L <10%					
3	Avg veg WL width b/w shoreline/streambank & 2 m depth contour	H >10m	M 3-10	L <3m					
4	Prevalence of strong-stemmed emerg. veg (shoreline marshes and fens only)	High	Med	Low					
5	Describe shoreline erosion potential	High	Med	Low					
6	Shoreline/streambank veg condition upslope of water level	Low	Med	High	Artificial				
SF21	***WL ability to stabilize shoreline***	***H***	***M***	***L***	N/A				
SECTION NINE: PLANT COMMUNITY									
1	Vegetation diversity	High	Med **X**	Low					
1b	Dominant plant species and % cover in the WL	list: Acer rubrum 40%, Doellingeria umbellatus 20%, Osmunda cinnamomea 15%							
3	Dominant Non-native or Invasive species and % cover	Yes	No **X**	specify: %					
4	Vegetation Disturbance	H	M **X**	L	specify type(s) below				
5	Disturbance Types	H_**X**_,ATV___,G___,,M___,In__, D/D___, Im___, OAH___, Ii___, Sd___,E___,,other___,							
7	Vegetative Integrity of plant community	E	H **X**	M	L				
SF22	***Is the plant community unique or rare regionally or provincially?***	***Yes***	***no*** **X**	***specify:***					
SF23	***Does the WL contain a diversity of plant communities***	***H***	***M*** **X**	***L***					
SF24	***Rate the overall integrity/quality of plant community?***	***H***	***M***	***L*** **X**					
SF25	***Are there any observed rare or endangered plant species? Specify.***	***End***	***Thr***	***SpC***	***Red***	***Yellow***	***S1***	***S2***	***S3*** ***N/A*** **X**

SECTION TEN: FISH AND WILDLIFE HABITAT AND INTEGRITY										
1	Interspersion of open water and vegetation (open water types only)	H	M	L	**N/A**					
1b	% cover in vegetation verus open water	_____%								
2	Interspersion that best fits entire wetland	H	M	L	N/A **X**					
3	Wetland condition related to detritus	H	M	L **X**	N/A					
4	Interspersion of other wetlands in vicinity	H	M **X**	L						
6	Barriers/restriction between wetland and other habitat	L **X**	M	H						
7	Noteworthy wildlife or evidence (birds, mammals, amphibians,etc)	Yes	No **X**	list:						
8	Connected to permanent water (accessible to fish)?	Exceptional	High	Med	Low	N/A **X**				
9	Fish species observed or evidence seen (list)	Yes	No **X**	list:						
10	Wetland part of contiguous upland or wetland:	>50ha **X**	25-50ha	10-25ha	<10ha					
11	WL provides habitat for:	**Amphibians**	**Reptiles**	Waterfowl	Waterbirds	Mammals	Fish	R/E species		
SF26	***Does wetland support fish/fish habitat?***	***Yes***	***No X***	***specify:***						
SF27	***Rare or endangered fish/wildlife species found in the wetland?***	***End***	***Thr***	***SpC***	***Red***	***Yellow***	***S1***	***S2***	***S3***	***N/A***
SF28	***Overall fish and wildlife habitat quality***	***H***	***M X***	**L**						
SECTION ELEVEN: COMMUNITY USE/VALUE										
1	Describe community use	VV__,CP__,CO__,PO__,PA__,,AV__,GB__,E__,HI__, WV__, BO__,HU__, PG__, BP__,F__, E__, R__, Other:								
SF29	***Rate the wetland's community use/value***	***H***	***M***	**L X**						

SF ratings highlighted in red indicate critical wetland functions or watershed conditions that are highly degraded. Whenever a wetland is found to have red-highlighted **SFs** the proponent is encouraged to contact NSE for advice about the approval because NSE is unlikely to approve alterations to wetlands that would affect these red-rated functions.

APPENDIX C:	Nova Scotia Wetland Evaluation Technique Field Data Sheet (September 2011)									
Wetland Number:	3									
Project Name: New Victoria		Evaluator: MMD		GPS Coordinates: 720592 mE, 5125179 mN						
PID: 15262371	Site Address:									
Sources and Dates of Mapping/Images:										
Evaluation Date: 28-Sep-15		Site Visit Date: 28-Sep-15								
Weather Conditions (past 48 hours): Warm, Dry										
Seasonal Weather Conditions: Warm, Dry										
SECTION ONE: WATERSHED CHARACTERISTICS										
1	Watershed Name (tertiary):	Size: km^2								
2	% Watershed Land Cover	For:	Nat:	Past/Hay:	Crop:	Urb/Com:	Road:	Other Dev:		
3	% Watershed WL Cover and by Class	Total: %	SM:	BO:	FE:	FM:	FS:	SS:	CP:	VP:
SF1	***Watershed condition***	***H***	***M***	***L***						
SF2	***Proportion of WL area in watershed & opportunity for floodwater detention***	***H***	***M***	***L***						
SECTION TWO: WETLAND CHARACTERISTICS										
Wetland Type: Complex - Treed swamp, shrub swamp		WL size: 0.13 hectares			Landform: Slope/Basin			Landscape Position: Outflow		
Water flow path: Outflow (presumed)		Wetland Origin: Natural								
1	Water Regime	PF	SF	TF	**SS**	PS	RfT	IfT	AF	
2	# WL's within 30m project area	Total# 4	SM:	BO:	FE:	FM:	FS: 3	SS:	CP:	VP:
3	Is WL part of complex	Yes **X**	No							
4	% each wetland type in complex	SM:	BO:	FE:	FM:	FS: 90	SS: 10	CP:	VP:	
5	Is WL bordering or associated with a lake or pond?	bordering		within 100m		N/A **X**		specify		
6	Standing water?	Yes	Avg Dep:		% Inundated:		No **X**			
7	Inlet or Outlet (circle all that apply)?	Inlet	Outlet **X** Presumed							
8	Adjacent Upland Land Use within 100m (%)	For: 100	Nat:	PasHay:	Crop:	UrbCm:	Road:	Other Dev:		
9	Are there stressors in WL or WL buffer area? Circle primary stressor(s).	DD__, CW__, WcS__, O/C__,EB__,DP__,F__,M__, ES__,NE__,DwP__,								
		M__,GC__,ATV__,DG__,EA__, R_**X**_,Rr__,U/CD__,F_**X**_,FA__, other (specify):								
10	Hydrology Altered (circle all that apply)?	Ditching	Dams	Tiles	Culvert	Well	Diversion	Other Specify:		
SF3	***Rate the general wetland condition/integrity***	**H X**	**M**	**L**						
SECTION THREE: ADJACENT LAND CONDITION AND INTEGRITY										
1	Average width of adjacent naturalized buffer	100 meters								
2	Widths for water quality	H >15 **X**	M 8-15	L <8						
3	Widths for wildlife habitat	H >100 **X**	M 15-100	L <15						
4	Adjacent area vegetation condition (list % in each category)	H **X**	M	L						
5	Adjacent area diversity and structure (list % in each category)	H **X**	M	L						
6	Adjacent Upland Slope (list % in each category)	Steep	Mod 20	Gentle 80						
7	Adjacent land supports water quality	*Yes* **X**	*No*	Specify:						
8	Adjacent land supports wildlife habitat	*Yes* **X**	*No*	Specify:						
SF4	***Rate the overall condition and integrity land adjacent to wetland***	***H*** **X**	***M***	***L***	**is buffer required to maintain red flag functions of wetland? If yes if no**					
SECTION FOUR: DOCUMENTED IMPORTANT FEATURES										
SF5	***Is the WL a WSS?***	***Yes***	***No*** **X**							
SF6	***Does the WL support commercial/recreational fish/shellfish?***	***Yes***	***No*** **X**							
SF7	***Species of concern (Fed/Prov)? Specify.***	***End***	***Thr***	***SpC***	***Red***	***Yellow***	***S1***	***S2***	***S3***	***N/A*** **X**
SF8	***Wetland has conservation/compensation agreements/activity?***	***Yes***	***No*** **X**	specify:						
SF9	***Wetland is calcerous fen, black ash or cedar swamp?***	***Yes***	***No*** **X**							
SF10	***Within Drinking Water Protected Area (designated watershed/wellfield)***	***Yes***	***No*** **X**	specify:						
SF11	***WL within a floodplain and upstream of or within of a populated area?***	***Yes***	***No*** **X**							
SF12	***Fed/Prov/Municipal area of interest?***	***Yes***	***No*** **X**	specify:						
SECTION FIVE: HYDROLOGIC CONDITION AND INTEGRITY										
1	Is WL source of stream or headwater(wc order 1 or 2)	***Yes*** **X**	No	Specify: Extends offsite to mapped WL/WC.						
2	Is WL geographically isolated?	Yes	No **X**	Specify: Extends offsite.						

3	WL ability to maintain characteristic hydrologic regime	High **X**		Med		Low			
4	Water Storage Depth (list % in each class)	>30cm	15-30cm	up to 15cm		No ponding **X**			
5	Signs of surface water retention observed?	SW__cm, WS **X**, WCD__, WM__cm, SM__cm, SD__, AD__, ID__, PMT__, AI__, BT__, AR__, Other:							
6	Describe observable/historical anthropogenic sediment delivery	Low **X**		Med		High			
7	Disturbance of WL soils	Low **X**		Med		High		Some rutting.	
8	Predominant soils adjacent to WL	Sand		Silt/loam **X**		Clay/bedrock			
9	Capacity of WL to alter/retard flows	High **X**		Med		Low			
10	Roughness coefficient for surface water flow path	High		Med		Low		**N/A X**	
11	Strormwater/Wastewater/Agricultural runoff detention	High		Med		Low **X**			
12	Water Source	Natural **X**		Mostly natural		Partly altered		Controlled	
13	Hydrology of tidal wetlands	Unrestricted		Reduced		Restricted		***N/A*** **X**	
14	Coastal storm surge	***Yes***	No **X**						
SF13	***WL hydrologic condition***	***Natural*** **X**	***Modified***		**Significantly Modified**				
SF14	***WL important for maintaining stream flow?***	***Yes*** **X**	***No***						
SF15	***WL ability to detain surface water***	***High***	***Med*** **X**	**Low**					
SECTION SIX: WATER QUALITY									
1	Strormwater/Wastewater/Agricultural runoff as water source?	High		Med		Low **X**			
2	Nutrients/sediments from surrounding land	High		Med		Low **X**			
3	Significant flood/stormwater attenuation	***Yes***	***No*** **X**						
4	Vegetation capacity to settle suspended sediments	High		Med **X**		Low			
5	WL type /landscape position holds/filters runoff?	***Yes*** **X**	***No***						
SF16	***Wetland improves water quality?***	***Yes*** **X**	***No***						
SF17	***Evidence of excess nutrient loading/contamination?***	***Low*** **X**	***Med***	***High***					
SF18	***WL contributes to water quality in downstream resources***	***High*** **X**	***Med***	***Low***					
SECTION SEVEN: GROUNDWATER INTERACTIONS									
1	Describe soils in wetland	Recharge		Discharge **X**					
2	Land use / run off in subwatershed upstream	Recharge **X**		Discharge					
3	Conditions of upland soils within 200m of wetland	Recharge		Discharge **X**					
4	Hydroperiod of wetland	Recharge		Discharge **X**					
5	Describe inlet/outlet configuration	Recharge **X**		Discharge					
6	Characterize topographic relief surrounding wetland	Recharge **X**		Discharge					
SF19	***WL serves as a recharge site***	***Yes***	***No*** **X**						
SF20	***WL serves as a discharge site***	***Yes***	***No*** **X**						
SECTION EIGHT: SHORELINE STABILIZATION AND INTEGRITY									
1	Wetland fringing ocean/estuary/lake/pond/river/stream?	***Yes***	No **X**	streamwidth >4m		streamwidth<4m		WB Exposed	WB Sheltered
2	% cover of rooted vegetation in shallow water zone	H >50%	M 10-50	L <10%					
3	Avg veg WL width b/w shoreline/streambank & 2 m depth contour	H >10m	M 3-10	L <3m					
4	Prevalence of strong-stemmed emerg. veg (shoreline marshes and fens only)	High	Med	Low					
5	Describe shoreline erosion potential	High	Med	Low					
6	Shoreline/streambank veg condition upslope of water level	Low	Med	High	Artificial				
SF21	***WL ability to stabilize shoreline***	***H***	***M***	***L***	N/A				
SECTION NINE: PLANT COMMUNITY									
1	Vegetation diversity	High	Med **X**	Low					
1b	Dominant plant species and % cover in the WL	list: Acer rubrum 25%, Juncus effusus 30%, Osmunda cinnamomea 30%							
3	Dominant Non-native or Invasive species and % cover	Yes	No **X**	specify: %					
4	Vegetation Disturbance	H	M **X**	L	specify type(s) below				
5	Disturbance Types	H_**X**_,ATV___,G___,,M___,In__, D/D___, Im___, OAH___, Ii___, Sd___,E___,,other___,							
7	Vegetative Integrity of plant community	E	H **X**	M	L				
SF22	***Is the plant community unique or rare regionally or provincially?***	***Yes***	***no*** **X**	***specify:***					
SF23	***Does the WL contain a diversity of plant communities***	***H***	***M*** **X**	***L***					
SF24	***Rate the overall integrity/quality of plant community?***	***H*** **X**	***M***	***L***					
SF25	***Are there any observed rare or endangered plant species? Specify.***	***End***	***Thr***	***SpC***	***Red***	***Yellow***	***S1***	***S2***	***S3***	***N/A*** **X**

SECTION TEN: FISH AND WILDLIFE HABITAT AND INTEGRITY										
1	Interspersion of open water and vegetation (open water types only)	H	M	L	**N/A**					
1b	% cover in vegetation verus open water	_____%								
2	Interspersion that best fits entire wetland	H	M	L	N/A **X**					
3	Wetland condition related to detritus	H	M	L **X**	N/A					
4	Interspersion of other wetlands in vicinity	H	M **X**	L						
6	Barriers/restriction between wetland and other habitat	L **X**	M	H						
7	Noteworthy wildlife or evidence (birds, mammals, amphibians,etc)	Yes	No	list: Dear tracks, garter snake						
8	Connected to permanent water (accessible to fish)?	Exceptional	High	Med	Low	N/A **X**				
9	Fish species observed or evidence seen (list)	Yes	No **X**	list:						
10	Wetland part of contiguous upland or wetland:	>50ha **X**	25-50ha	10-25ha	<10ha					
11	WL provides habitat for:	**Amphibians**	**Reptiles**	Waterfowl	Waterbirds	Mammals	Fish	R/E species		
SF26	***Does wetland support fish/fish habitat?***	***Yes***	***No*** **X**	***specify:***						
SF27	***Rare or endangered fish/wildlife species found in the wetland?***	***End***	***Thr***	***SpC***	***Red***	***Yellow***	***S1***	***S2***	***S3***	***N/A*** **X**
SF28	***Overall fish and wildlife habitat quality***	***H***	***M*** **X**	**L**						
SECTION ELEVEN: COMMUNITY USE/VALUE										
1	Describe community use	VV__,CP__,CO__,PO__,PA__,,AV__,GB__,E__,HI__, WV__, BO__,HU__, PG__, BP__,F__, E__, R__, Other:								
SF29	***Rate the wetland's community use/value***	***H***	***M***	**L** **X**						

SF ratings highlighted in red indicate critical wetland functions or watershed conditions that are highly degraded. Whenever a wetland is found to have red-highlighted **SFs** the proponent is encouraged to contact NSE for advice about the approval because NSE is unlikely to approve alterations to wetlands that would affect these red-rated functions.

APPENDIX VII. ARCHAEOLOGICAL REPORTS

Lingan Community Wind Project

Archaeological Resource Impact Assessment

HRP# A2015NS054

DAVIS MACINTYRE & ASSOCIATES
ARCHAEOLOGICAL CONSULTANTS

109 John Stewart Drive, Dartmouth, NS B2W 4J7

LINGAN COMMUNITY WIND PROJECT:
ARCHAEOLOGICAL RESOURCE IMPACT ASSESSMENT

Heritage Research Permit A2015NS054
Category C

Davis MacIntyre & Associates Limited
Project No.: 15-016.1MEC

Principal Investigator: Laura de Boer
Report Compiled by: Laura de Boer and Irene Hart

Submitted to:

McCallum Environmental Ltd.
208 Kingswood Drive
Hammonds Plains, NS B4B 1L2

-and-

Coordinator, Special Places
Communities, Culture and Heritage
1741 Brunswick Street P.O. Box 456
Halifax, NS B3H 3A6

Cover: The collector tower approximately 500m from the proposed turbine site, looking northeast.

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EXECUTIVE SUMMARY

In July 2015, Davis MacIntyre & Associates Limited was contracted by McCallum Environmental on behalf of Celtic Current to conduct an archaeological resource impact assessment of the proposed Lingan Community Wind Project. The assessment included a historic background study as well as a field reconnaissance of all areas to be impacted.

This assessment has indicated that although historic and twentieth century activity is known in the immediate area, the proposed access road and turbine site are of low potential for archaeological resources. As such, no further mitigation is currently recommended.

If the turbine or access road layout is significantly altered, it is recommended that the new layout be reassessed by a qualified archaeologist in order to determine the potential for significant heritage resources within a new impact area.

Due to the site's proximity to a WWII base, there is a slightly elevated chance of encountering unexploded ordinance (UXOs) during construction. Any suspected UXOs should be treated with extreme caution. Should construction crews or any other personnel encounter an object that might form part of an explosive, activity near that object and its origin site should immediately cease and a UXO specialist or the nearest military base should immediately be contacted.

In the unlikely event that archaeological resources are encountered, it is recommended that any ground-disturbing activity be halted immediately and the Coordinator of Special Places (902-424-6475) be contacted immediately regarding a suitable method of mitigation.

1.0 INTRODUCTION

In July 2015, Davis MacIntyre & Associates Limited was contracted by McCallum Environmental to conduct an archaeological resource impact assessment of the proposed Lingan Community Wind Project. The assessment included a historic background study as well as a field reconnaissance of all areas to be impacted.

This assessment was conducted under Category C (Archaeological Resource Impact Assessment) Heritage Research Permit A2015NS054 issued by the Department of Communities, Culture and Heritage. This report conforms to the standards required by the Culture and Heritage Development Division under the Special Places Protection Act (*R.S., c. 438, s. 1*).

2.0 STUDY AREA

Celtic Current is proposing to construct a single wind turbine in New Victoria near Victoria Mines, north of Sydney and west of Lingan and New Waterford (Figure 2-1). The turbine will be located on PID#15262371, where a wind collector tower has already been constructed in a small inactive quarry.

The study area is located within the Sydney Coalfield Natural Theme Region (#531) (Figure 2-2). The coalfield lies within a Pictou-Morien Group area of sandstones and siltstones, mantled with sandy to stony till. Coal seams are exposed from Point Aconi to Port Morien, twelve of which are productive seams averaging at 1-2m in thickness.

Along the coast on flat terrain, imperfectly drained Springhill soils and poorly drained Economy soils have developed. Farther inland, the undulating landscape features well-drained Shulie soils over stony, sandy loam tills.

The annual average fog occurrence is 80 days, happening most frequently between May and July. No major rivers are found in this Unit, though short streams and brooks connect numerous small lakes.

Loucks' Sugar Maple-Hemlock, Pine Zone encompasses the Unit, but repeated disturbance has modified the vegetation. The result is forests dominated by conifers, including White Spruce, Black Spruce, Balsam Fir, and Larch. Burnt areas have regrown with maple, aspen, and birch, while shade-intolerant species are found on ridges within the coniferous forests.

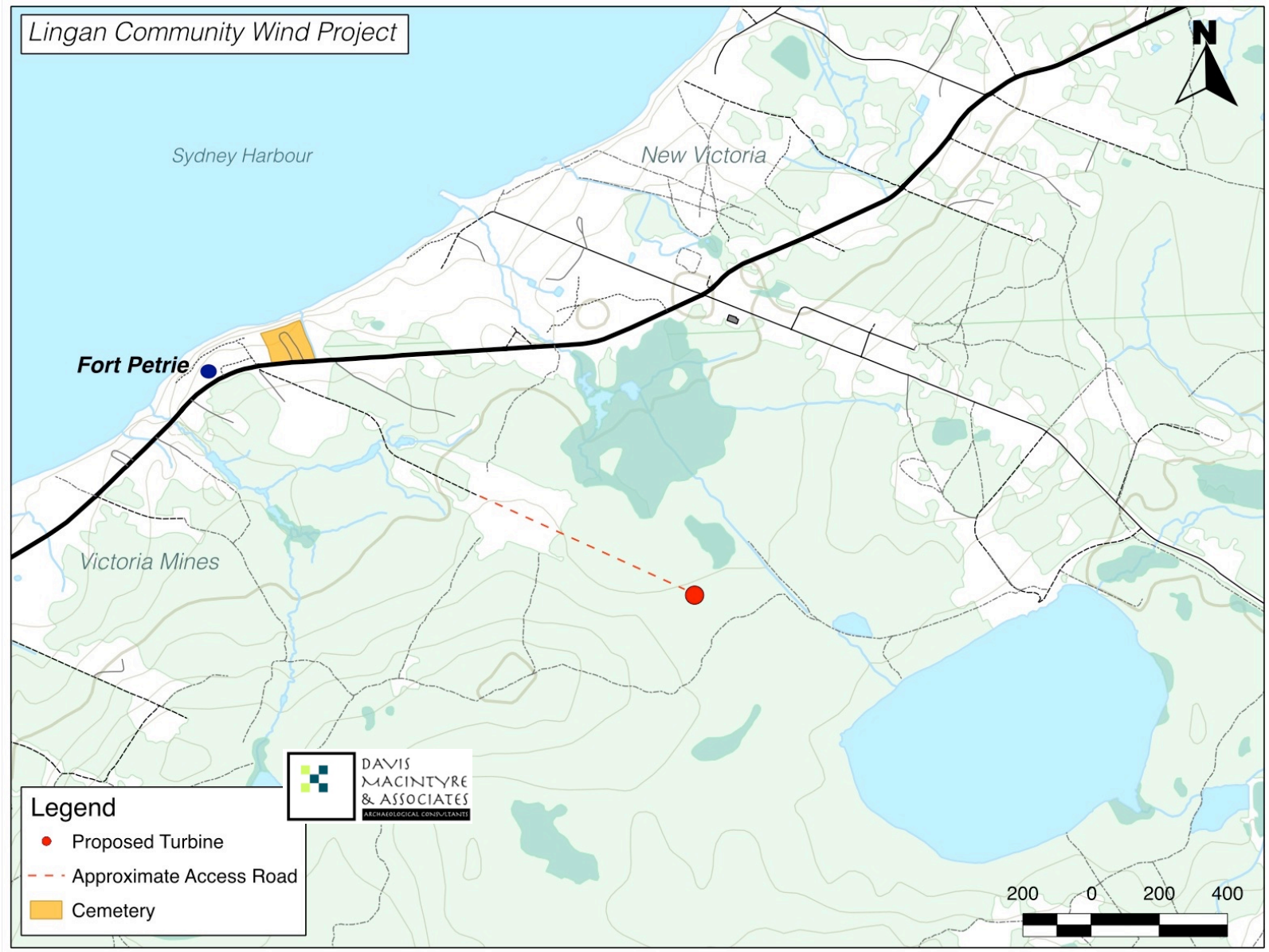

Figure 2-1: A map showing the proposed turbine location in relation to the coast, New Victoria and Victoria Mines, and a network of walking trails to the West, South, and East.

Urban development in this Unit has resulted in strong populations of mammals typically found in proximity to developed areas. These include deer, coyote, Red Squirrel, Snowshoe Hare, and Red-backed Vole. Bald Eagle nesting habitats can be found, as can seabird nesting sites. Ciboux and Hertford (Bird Islands) are considered to be of national importance as hosts to nesting Razorbill, Atlantic Puffin, Leach's Storm-petrel, and Black-legged Kittiwakes.[1]

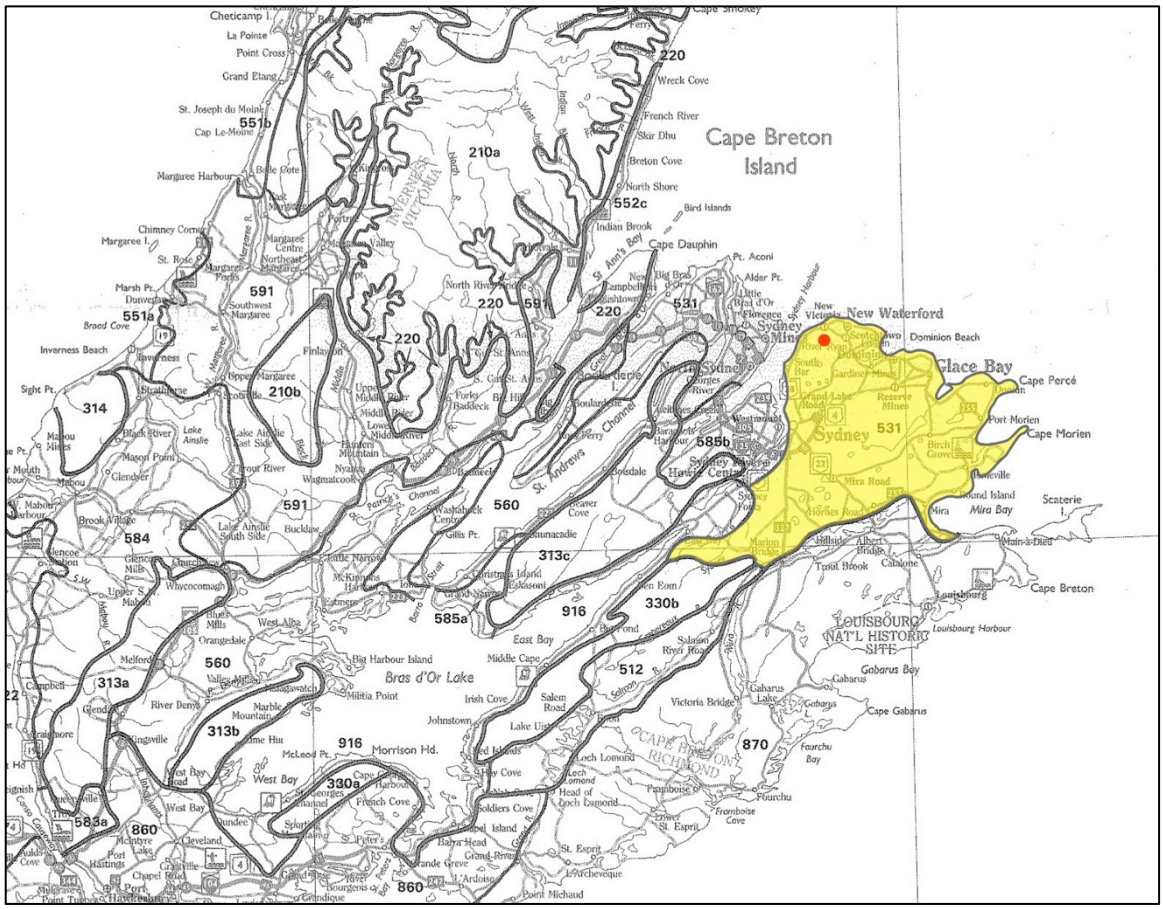

Figure 2-2: A map showing the Sydney Coalfields Natural Theme Region (#531, highlighted). The approximate turbine location is shown in red. After Davis and Browne 1996.

3.0 METHODOLOGY

A historic background study was conducted by Davis MacIntyre & Associates Limited in July 2015. Historical maps and manuscripts and published literature were consulted at the Nova Scotia Archives as well as online. The Maritime Archaeological Resource

[1] Davis and Browne 1996:116-118.

Inventory, a database of known archaeological resources in the Maritime region, was searched to understand prior archaeological research and known archaeological resources neighbouring the study area. Finally, a field reconnaissance was conducted in order to further evaluate the potential for archaeological resources.

3.1 Maritime Archaeological Resource Inventory

The Maritime Archaeological Resource Inventory, a database of known archaeological sites in the Maritime Provinces, was consulted in July 2015. No archaeological sites have been recorded within 5km of the study area.

The absence of recorded archaeological resources within or immediately adjacent the proposed development area is likely an indication that this area was not subjected to previous archaeological assessments.

3.2 Historic Background

3.2.1 First Nations Land Use and Settlement

Nova Scotia has been home to the Mi'kmaq and their ancestors for at least 11,500 years. A legacy of experience built over millennia shaped cultural beliefs and practices, creating an intimate relationship between populations and the land itself. The complexity of this history, culturally and ecologically, is still being explored.

The earliest period is *Sa'qewe'l L'nu'k* (the Ancient People) or the Paleo-Indian period (11,500 – 9,000BP). The changing ecology following deglaciation allowed the entrance of large herds of migratory caribou into Nova Scotia, followed by Paleoindian groups from the south. Currently, the Debert/Belmont Sites provide the only significant evidence of Paleo-Indian settlement in the province. Commonly believed to be big-game hunters, research is now aimed at exploring the diverse subsistence patterns that may have supported populations, and what adaptations were made when the environment shifted once again in the early Holocene.

Succeeding the *Sa'qewe'l L'nu'k* is the *Mu Awsami Kejihaw'k L'nu'k* (the Not so Recent People) or the Archaic Period (9,000-3,000 BP). This time saw a reorientation to a more maritime subsistence, with settlement pivoting more towards coastal areas, lakes and bountiful riverine resources. Remnants of these sites along the coast have largely been engulfed by rising seas or battered by wind and wave, though interior sites are increasingly being discovered. Ground stone tools, specialized for wood-working, appear

at this time and may have been used to create dug-out canoes. Numerous traditions and distinct technologies have been documented throughout Maine and the Atlantic provinces. A growing catalogue of exotic cultural components demonstrates that groups within Nova Scotia were engaged in spheres of interaction spanning hundreds of kilometers. Unfortunately, a lack of formally excavated sites within Nova Scotia still obscures the degree to which these traditions were present.

By the *Kejihawek L'nu'k* (the Recent People) or Woodland/Ceramic period (3,000-500 BP), the Mi'kmaq were a maritime people. Known Woodland/Ceramic sites concentrate along coasts shorelines, and navigable watercourses. Migration of ideas and people introduced new worldviews and technologies from groups originating in places like northern New England and the Great Lakes area, to local populations, including the earliest ceramic forms. Harvesting of marine molluscs and shellfish appears in this period, and substantial shell-middens have gifted archaeologists with well-preserved records of these past lives. Fish weirs populating the province's rivers and streams speak to the importance of migrating fish species to Mi'kmaq life. Terrestrial hunting and foraging was practiced with varying degrees of intensity depending on seasonality and region. A generally stable cultural form is believed to have developed by 2,000 BP, forming the way of life first encountered by Europeans arriving on our shores.

Mi'kmaw life was substantially altered in the *Kiskukew'k L'nu'k* (Today's People) or Contact Period (500 BP- Present). Trade and European settlement introduced change and upheaval to the traditional way of First Nation life. Mobile hunting and gathering still defined Mi'kmaw life, with identity residing within family households. Trading posts and fishing villages became intersections of European and Mi'kmaq interaction, affecting traditional seasonal rounds and access to land. The hunting of fur-bearing mammals intensified to satisfy the mutual exchange of skins for European goods. It is not accurate, however, to say that Mi'kmaq *adopted* European goods and culture, but rather *adapted* it. The Mi'kmaq remained an influential social and political force well into the 18th century, forming a triadic narrative of contention with the English and French. However, disease, conflict, and alienation from the land wreaked a ruinous effect on the Mi'kmaq by the 19th century, pushing people to the margins of colonial society.

Mi'kmaq Period	Archaeological Period	Years
Sa'qewe'l L'nu'k (the Ancient People)	Paleo-Indian	11,500 – 9,000 BP
Mu Awsami Kejihaw'k L'nu'k (the Not so Recent People)	Archaic	9,000 –3,000 BP
Kejihawek L'nu'k (the Recent People)	Woodland/Ceramic Period	3,000 –500 BP
Kiskukewe'k L'nu'k (Today's People)	Contact	500 BP – present

Table 1: Mi'kmaq/Archaeological Cultural Periods

The Mi'kmaq inhabited the territory known as *Mi'kma'ki* or *Megumaage*, which included all of Nova Scotia including Cape Breton, Prince Edward Island, New Brunswick (north of the Saint John River), the Gaspé region of Quebec, part of Maine and southwestern Newfoundland (Figure 3-1).[2] The name Lingan, a community east of the study area and for which the wind farm has been named, comes from the French "L'Indienne," although the Mi'kmaw name for that area was *Milesek.*[3]

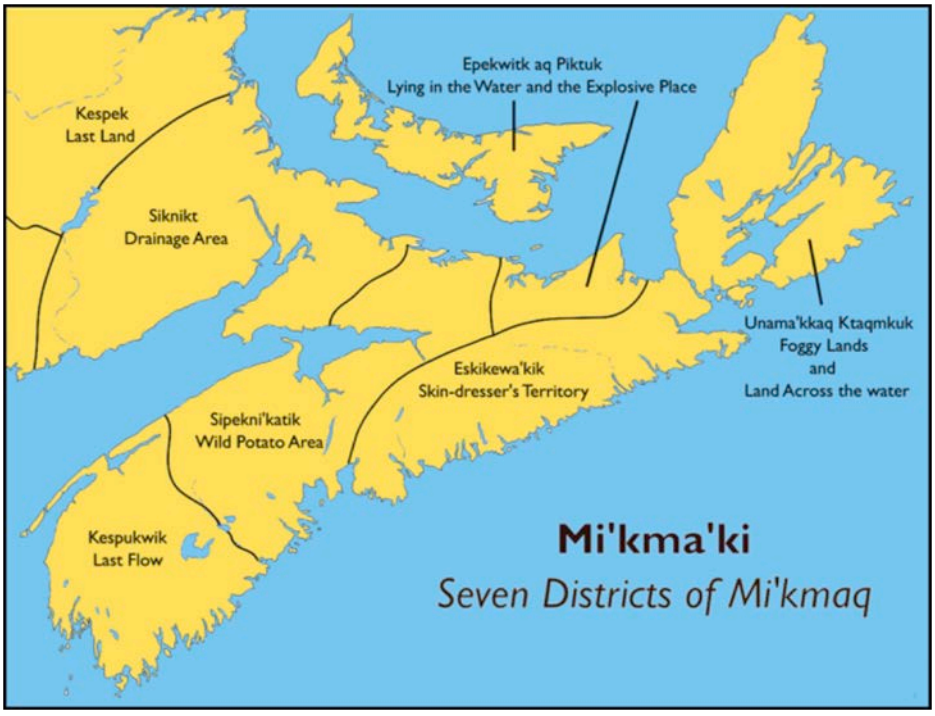

Figure 3-1: Map of the Mi'kmaq districts.[4]

[2] Confederacy of Mainland Mi'kmaq, 2007:11.
[3] Fergusson 1967:355.
[4] Based upon Confederacy of Mainland Mi'kmaq 2007:11.

Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO) was contacted on July 8th 2015 as part of this assessment. At the time of the completion of this report, no response regarding our inquiry has been received.

3.2.2 European Settlement

The closest settlements to the study area include New Victoria, Victoria Mines, and New Waterford. Early Irish settlers established themselves along these shores in the late eighteenth century. They named the entire point from Sydney Harbour to Lingan "Lowpoint."[5]

It has been indicated by a volunteer at the nearby Fort Petrie museum that the coast near the study area had been the site of a much earlier fort, dating perhaps to the French occupation of the Island of Cape Breton when it was known as Isle Royale. However, the research conducted during this background study did not reveal any published reference to such a fort. There was some coal mining carried out at Spanish River (Sydney Harbour) prior to and into the 1780s and 1790s.[6]

New Victoria and Victoria Mines were named in honour of Queen Victoria, who reigned from 1837 to 1901. At Victoria Mines, Henry Neil, John Naylor, Thomas Davis, John Gardner, Alexander Elder, and Jane Clarke all obtained grants of land in 1794. [7] Additional settlers continued to obtain land grants in the area of New Victoria in the following years, including Michael Mullins. Mullins purchased a lease for the land close to the proposed turbine location in 1810 and settled there by the 1820's next to land purchased by Lucy MacDonald and John Petrie (Figure 3-2).[8]

A church was built in the area in 1869 and a way office was established at Victoria Mines under Alexander C. Ross. Mining had begun in 1867 near Low Point by Ross and Company and in 1868 a temporary railway was built to a wharf a quarter mile distant.[9]

The General Mining Association opened the Victoria Mine at Low Point in 1882. It was sold to the Dominion Coal Company in 1894 and closed down in 1898. It was reopened in 1913 as Dominion No. 17 Colliery. The population in 1956 in New Victoria was at 993, and 249 in Victoria Mines.[10]

New Waterford was incorporated in 1913, 14 miles north-northeast of Sydney by highway, and east of the study area. Before its incorporation, the locality was formerly

[5] Ferguson 1967: 482
[6] Brown 1869: 404.
[7] Ferguson 1967: 482
[8] Ferguson 1967: 483
[9] Ferguson 1967: 483
[10] Ferguson 1967: 483

known as Barrachois, meaning lagoon or pond. The community of New Waterford is named after the Irish seaport and shire town of the same name from which many of the town's settlers hailed.[11]

Before the town's establishment, a few scattered farms existed in the area, as well as some fishermen's dwellings and the abandoned sites of the Victoria Colliery, which had been abandoned in 1898, as well as the Lingan colliery, which had opened in the Lingan seam in 1854 a few miles east of the site of New Waterford, and closed in 1866.[12]

New Waterford was planned and developed to accommodate the workers of families attracted to the site for its new mining operations in the mining boom before the outbreak of the First World War. Before No. 12 Colliery opened in 1907, New Waterford was unknown to Nova Scotia. Within months of its opening, the population began to soar and mining operators began laying out a new community. Thus, the opening of the No. 12 Colliery paved the way for the start of the community.[13]

A few buildings were built in the area to serve its residents, including a hospital in 1913, which closed in 1963, and a training school for nurses. A school was built in 1908 and the New Waterford Post Office was established in 1907. Our Lady of Mount Carmel Parish was formed at New Waterford in 1912 and St. Agnes Parish of the Roman Catholic Church was formed in 1914. A 7-mile spur of Sydney and Louisburg railway, from Victoria Mines to No. 12 Colliery, served the town. The population at New Waterford in 1956 was 10,881. [14]

The Dominion Coal Company commenced operations at New Waterford in September of 1907. Dominion No. 14 was begun in 1908, Dominion No. 15 in 1910, Dominion No. 16 in 1911 and Dominion No. 17 in 1913. This mining activity attracted many settlers: Irish, Scottish, English, and Eastern Europeans. [15]

The town of New Waterford heavily relied on its mining industry to survive, and like many other mining towns in Nova Scotia, the people of New Waterford experienced their share of tragedies within the mines. In July of 1917, an explosion 2000 feet down the slope of the No. 12 Colliery resulted in the deaths of 65 men and boys. The final tally of 65 killed included 22 Newfoundlanders, seven of whom hailed from one small fishing village. Amazingly, one miner of German nationality was found alive in a distant section of the affected area; apparently he remained alive by holding onto an airline until finally rescued.[16]

[11] PANS Micro #5906, Chronicle Herald Aug 2nd 1963 p: 18-19
[12] PANS Micro # 5906, Chronicle Herald, Aug 2nd 1963, p: 18
[13] PANS Micro: #5568, Morning Chronicle, Jan 3rd 1910, p:14
[14] Ferguson 1967: 484-485
[15] Ferguson 1967: 484-485
[16] Nova Scotia Archives. URL.

The fluctuating demand for coal also caused friction within the town, which resulted in a number of strikes in the Sydney Coal Field in the 1920's. On June 10th, 1925, William Davis and a parade of miners were marching to Waterford Lake Power Plant. When the march began to turn violent a police officer deliberately shot at Davis who was instantly killed. Other shots were fired into the crowd and two other miners were injured. The anniversary of Davis' death is still observed in New Waterford today.[17]

Although historic records show extensive coal mining activity in proximity to the study area, historic maps indicate that little such activity occurred on or immediately adjacent to the proposed impact zone (Figures 3-3 and 3-4).

Over the years coal operations began to decline and disappear in Cape Breton. Dominion No. 18 Colliery was opened at New Victoria in 1939 and the operations of other mines were consolidated. Dominion No. 16 Colliery ceased operations in 1963, leaving only No. 12 and No. 18 Collieries in operation. [18]

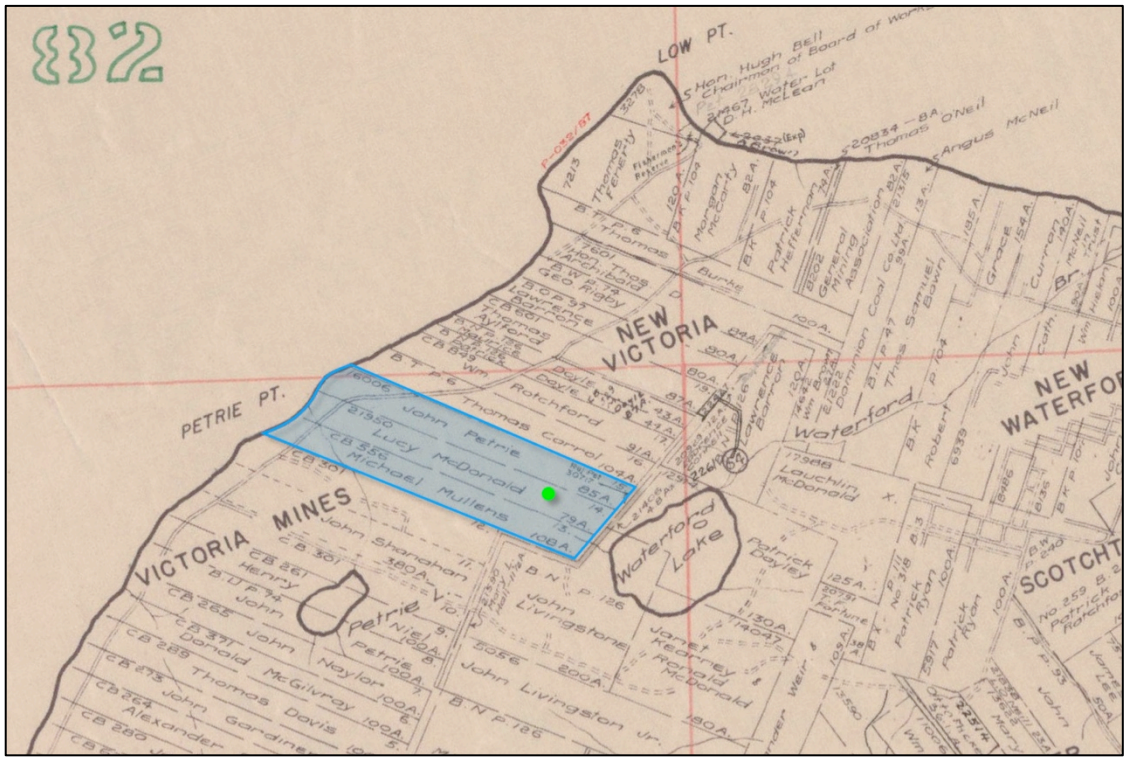

Figure 3-2: Land grant map outlining the approximate study location of the proposed Lingan turbine in green, with nearby land grants outlined in blue.[19]

[17] Ferguson 1967: 484
[18] Ferguson 1967: 484
[19] Department of Lands and Forests 1946

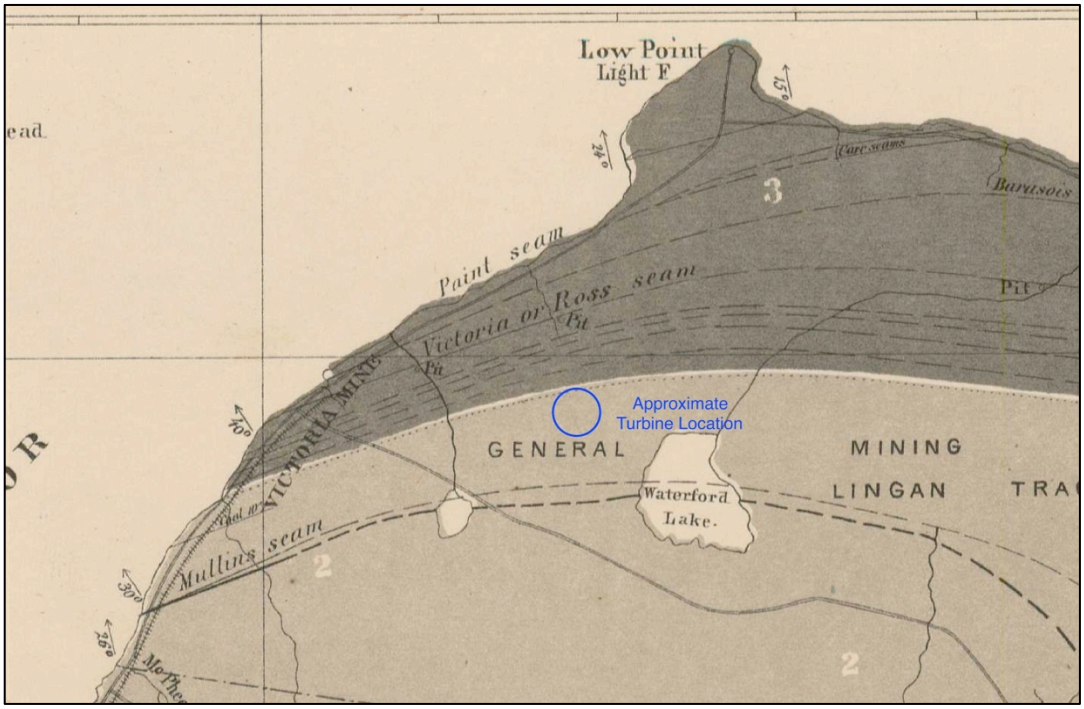

Figure 3-3: Geological map of the Sydney Coal Field, Cape Breton, Nova Scotia. The approximate study area is circled in blue.[20]

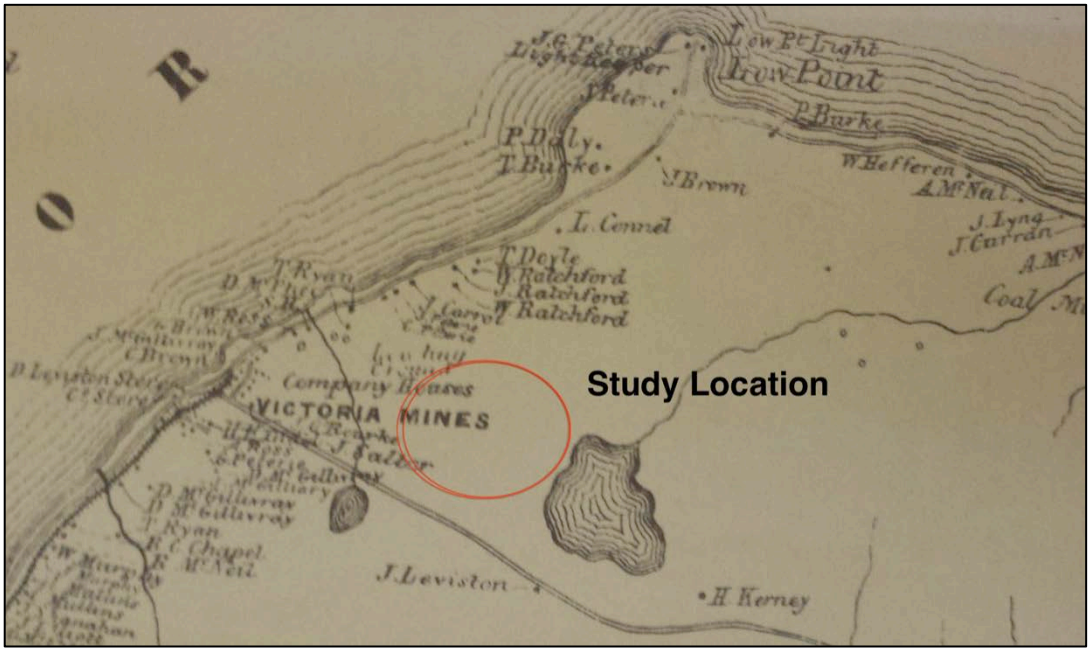

Figure 3-4: An 1864 topographical township map of Cape Breton County showing the approximate study area of the Lingan turbine. The closest settlement, Victoria Mines, can be seen to the left of the circled area.[21]

[20] Fletcher 1876.

Of particular note in proximity to the study area is a WWII Battery post named Fort Petrie located in the town of New Victoria, on the eastern shore of the Sydney Harbour. This fortification is quite close to the access road to the Lingan turbine (Figure 3-5).

With a strategic view of the Sydney Harbour, the fort was used during both World Wars as an observation post. The site is now a military museum run on public donation. In 1998, by the National Historic Sites and Monuments Board, Fort Petrie was recognized as a National Historic Site.[22]

The current fort was erected in the late 30's to protect merchant ships and convoys, as the threat of German invasion was growing. The defenses were also built for protecting facilities that contributed to Canada's war effort while also training large numbers of gunners and infantrymen who would eventually serve in Europe.[23] At the time of the Second World War, the National Defense Headquarters had ordered the army's coastal commanders to begin the construction of temporary sites for the interim artillery armament. Five positions were planned for the Sydney area, including Fort Petrie.[24] On the site of the fortification is a 2-storey underground bunker with ammunition storage rooms, machine shops and a Battery Observation Post with a 3-level tower.[25] Fort Petrie had some of the heavier guns and artillery and was an important site because of its seaward command (Figure 3-6). Work on Fort Petrie began at the end of November 1939 and was virtually completed by the end of April 1940, built by E.G.M. Cape and Company of Montreal.[26] It formed one of many harbour defences in and around Sydney and Sydney Harbour (Figures 3-7 and 3-8). By 1948 the wartime emphasis on coastal artillery began to dissipate. [27] Fort Petrie was eventually decommissioned and closed in 1956.[28]

During field reconnaissance, the team made notable contact with two local residents who provided information relevant to this assessment. The first was Fort Petrie Military Museum volunteer Rob Grezel, who in addition to discussing the interesting history of Fort Petrie itself, indicated that a large WWII artillery shell had been recovered live from a nearby farmer's field. Having been professionally disarmed, it is now on display at the museum.

[21] Church 1864.
[22] Donovan 1985: 7
[23] Donovan, 1985: 177
[24] Tennyson & Sarty 2000: 215
[25] Tennyson & Sarty, 2000: 224
[26] Tennyson & Sarty ,2000: 223
[27] Donovan, 1985: 179
[28] Donovan, 1985: 181

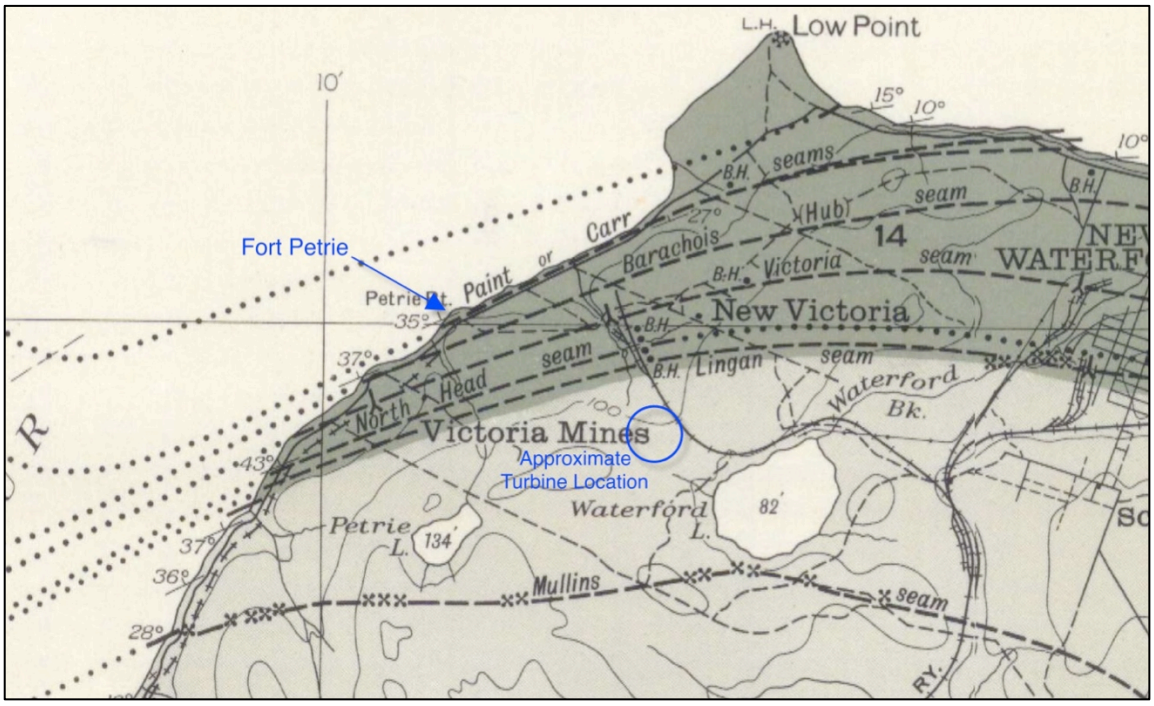

Figure 3-5: GeoScan map from 1938 showing the location of Fort Petrie and the approximate location of the Lingan turbine.[29]

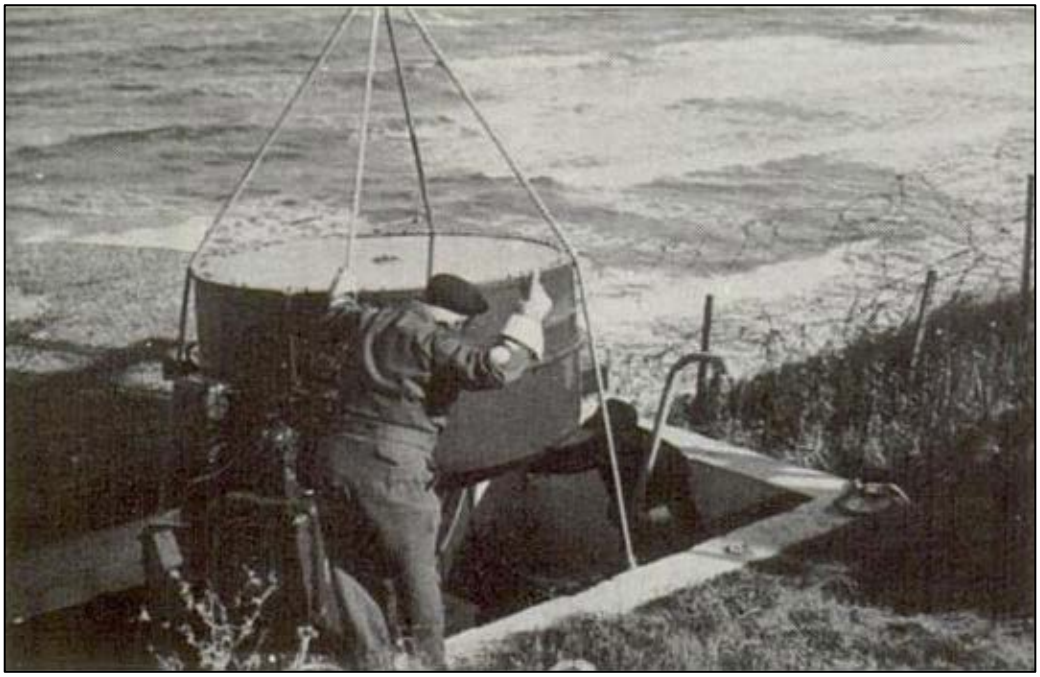

Figure 3-6: A five foot diameter search light being removed from a " Defense electric light Coast Artillery Search Light" emplacement at Fort Petrie, October 1956.[30]

[29] Hayes, Bell, and Goranson 1938.
[30] Donovan, 1985: 180

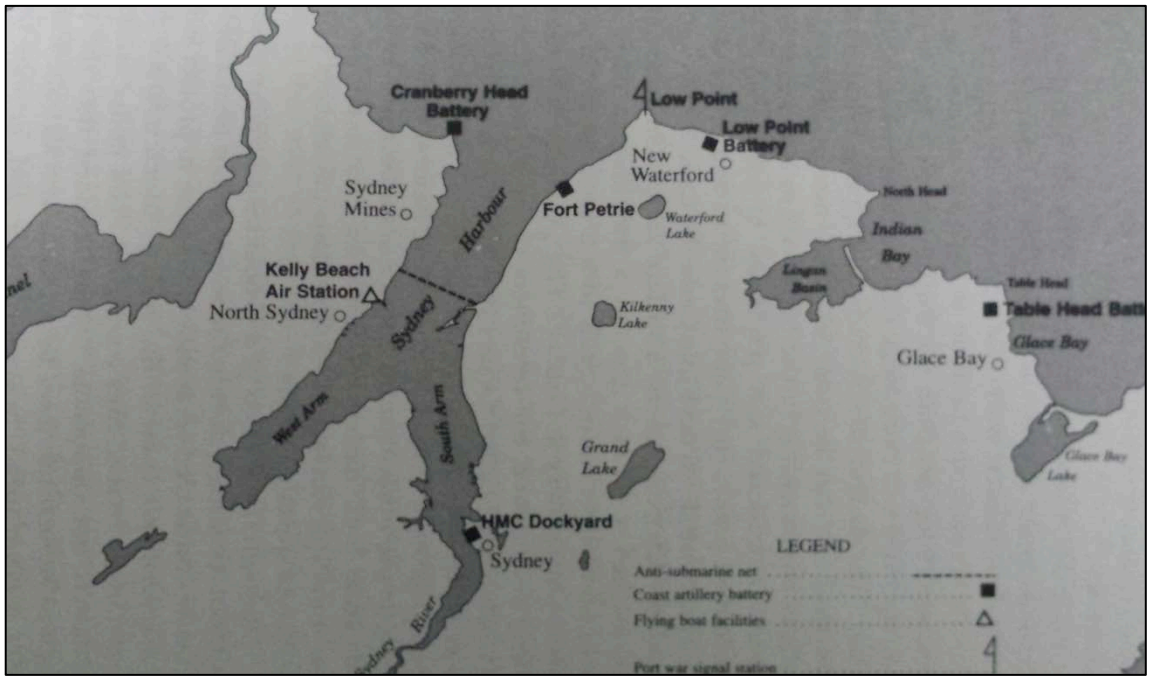

Figure 3-7: Picture showing Fort Petrie amongst the Sydney Defence Installations of 1918.[31]

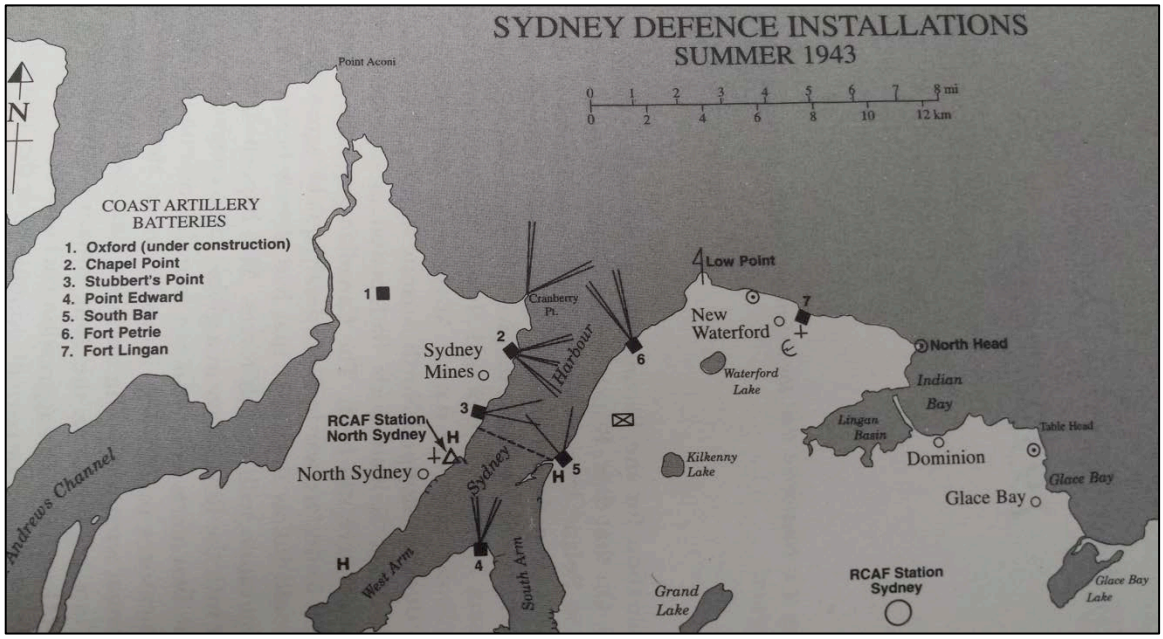

Figure 3-8: Picture showing the Sydney Defense Installations Map for the summer of 1943. Fort Petrie can be seen as #6 on the map.[32]

[31] Tennyson & Sarty, 2000: 139
[32] Tennyson & Sarty, 2000: 210

Local resident Betty Garneau was also informally interviewed, as her house is the white house located immediately south of the existing quarry access road, and at age 86 she has lived in the house (and a previous house on the same foundation) for her entire life. Ms. Garneau indicated that she frequently walks trails extending eastward from her home and skirting the study area. A historic house foundation surrounded by apple trees is known to her south of the study area, and a historic well can be found on a footpath leading north from the quarry, but she is unaware of any archaeological resources or significant historical activity in close proximity to the study area. She indicated that before the forest regrew, the area had been predominantly covered in blueberry fields, which is consistent with the topography observed during the field reconnaissance.

3.3 Field Reconnaissance

A field reconnaissance of the impact area was conducted by Laura de Boer and Irene Hart on 6 July 2015. The survey was guided by hand-held GPS, with the provided coordinates of NAD83 UTM Zone 20T 720767 5125046. Terrain and vegetation changes within the study area were noted in the pursuit of positive or negative evidence for historic cultural activity. GIS data for the access road was not available, but the team followed a straight line as indicated by McCallum Environmental from the existing quarry access to the turbine, comprising approximately 450m of new road.

The existing access road passes closely between two houses near Route 28 (New Waterford Road, one house belonging to Betty Garneau) before entering a forested section and finally opening onto a small, privately owned quarry. Near the New Waterford Road, the access road passes beside a household garden, and a brief examination of the exposed soils in the garden revealed no signs of archaeological materials.

The existing aggregate quarry does not appear to be currently active but has not yet become significantly overgrown. As mentioned above, a data collector tower has been erected near the middle of the quarry (Plate 1). Along the quarry's southern edge, exposed soil profiles allowed the team to once again examine the native soils in addition to the exposed aggregate of the quarry (Plate 2). Again, no archaeological material was observed.

Proceeding into the woods along the proposed access route, the team observed a young mixed-wood forest with pockets of sparser growth and tree stumps indicating logging activity within the past several years. Short sections of wet, mossy forest with scrubby hardwood growth were also encountered due to the area's fairly flat topography. A rapidly overgrowing skidder trail was later used to exit from the proposed turbine site, and both brush and larger logs had been used to form a corduroy road in several wet sections along this route (Plates 3 and 4).

Aside from the logging activity, the forest was noted for having a somewhat smoother topography and relatively open understory in comparison with many young mixed-wood forests in Nova Scotia. This smoother topography, which was observed throughout the forest covered during the survey, is a natural tableland consistent with the landscape of the coast between New Waterford and Donkin.

Like the proposed access road, the proposed turbine site is found in a young mixed-wood forest including birch, maple, and spruce (Plate 5). Ferns form a slightly denser ground cover here than elsewhere along the route from the quarry, but the forest remained fairly open in terms of visibility (Plate 6). Although a rail line is known approximately 200m northeast and walking trails are found to the south and southeast, no signs of cultural activity beyond recent logging were noted in proximity to the turbine's proposed centre point.

4.0 RESULTS AND DISCUSSION

Both desk-based research and a field reconnaissance have indicated that the proposed access road and turbine site are of low potential for archaeological resources. Although historic archaeological resources have been indicated on adjacent properties by local residents, none appear to lie within or in close proximity to the impact zone.

It should be noted that the study area's proximity to Fort Petrie is notable as it creates an unusual concern: the presence of unexploded ordinance (UXOs) is a slim but present danger, as indicated by a large artillery shell that as discussed above was found still live in a nearby field.

5.0 RECOMMENDATIONS AND CONCLUSIONS

This assessment has indicated that although historic and twentieth century activity is known in the immediate area, the proposed access road and turbine site are of low potential for archaeological resources. As such, no further mitigation is currently recommended.

If the turbine or access road layout is significantly altered, it is recommended that the new layout be reassessed by a qualified archaeologist in order to determine the potential for significant heritage resources within a new impact area.

As noted in the previous section, any suspected UXOs should be treated with extreme caution. Should construction crews or any other personnel encounter an object that

might form part of an explosive, activity near that object and its origin site should immediately cease and a UXO specialist or the nearest military base should immediately be contacted.

In the unlikely event that such resources are encountered, it is recommended that any ground-disturbing activity be halted immediately and the Coordinator of Special Places (902-424-6475) be contacted immediately regarding a suitable method of mitigation.

6.0 REFERENCES CITED

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PLATES

Plate 1: The quarry and collector tower, looking northwest.

Plate 2: Exposed soil profiles at the southern edge of the quarry, looking south.

Plate 3: An overgrown skidder trail south of the proposed turbine site, looking northeast.

Plate 4: A wet area of the overgrown skidder trail, looking northwest.

Plate 5: The approximate centre of the proposed turbine site, looking east.

Plate 6: The forest within the proposed turbine site's impact area, looking southwest.

APPENDIX A: HERITAGE RESEARCH PERMIT

NOVA SCOTIA

Heritage Research Permit (Archaeology)

Special Places Protection Act 1989

(Original becomes Permit when approved by Communities, Culture and Heritage)

Office Use Only
Permit Number:
A2015NS054

Greyed out fields will be made publically available. Please choose your project name accordingly	
Surname de Boer	First Name Laura
Project Name Lingan Community Wind Project	
Name of Organization Davis MacIntyre & Associates Ltd.	
Representing (if applicable) McCallum Environmental	
Permit Start Date 2 July 2015	Permit End Date 30 August 2015
General Location: Lingan, Cape Breton	

Specific Location: *(cite Borden numbers and UTM designations where appropriate and as described separately in accordance with the attached Project Description. Please refer to the appropriate Archaeological Heritage Research Permit Guidelines for the appropriate Project Description format)*

PID 15262371

Permit Category:
Please choose one

- ☐ Category A – Archaeological Reconnaissance
- ☐ Category B – Archaeological Research
- ☑ Category C – Archaeological Resource Impact Assessment
- ☑ I certify that I am familiar with the provisions of the *Special Places Protection Act* of Nova Scotia and that I have read, understand and will abide by the terms and conditions listed in the Heritage Research Permit Guidelines for the above noted category.

Signature of applicant Anna MacIntyre for Laura de Boer	Date 18 June 2015
Approved by Executive Director	Date June 25-15