project

TANTRAMAR MARSH-STANDARD OPERATING PROCEDURE (SOP) FOR WIND

OVERVIEW

- Previous SOP objective was to advise motorists of hazardous wind conditions, but with no indication of how this would be accomplished.
- WSP developed a comprehensive and actionable SOP based on the following:
  - Background info and work studies undertaken on this section of Route 2.
  - Current procedures NBDTI follows for high wind situations.
  - Past RWIS data from marsh area.
  - Various similar locations where high winds are an issue.
  - Research into impact of wind on vehicle stability.
  - How Environment Canada handles high wind issues.

project

TANTRAMAR MARSH-STANDARD OPERATING PROCEDURE (SOP) FOR WIND

EXCELLENCE AND INNOVATION

- Based on analysis of RWIS data, it was shown that the Tantramar Marsh does not need be completely closed to all traffic based solely on high wind events.
- WSP provided an improved SOP and gave numerous recommendations for upgrading existing infrastructure.
- WSP's work also amended the polling interval of the RWIS to better align with other locations, while increasing the gust and steady wind speed thresholds to be congruent with other high wind locations and Environment Canada.

project

TANTRAMAR MARSH-STANDARD OPERATING PROCEDURE (SOP) FOR WIND

DIVERSITY AND INCLUSION

- WSP met with District 3 staff to discuss the current SOP and the need for more guidance in dealing with high wind situations as part of an updated SOP.
- Similar locations were investigated to see how they approach this situation.
- WSP also reached out to the area supervisor for Nova Scotia portion of the Tantramar Marsh to collaborate with their current practices and include them in the SOP.

project

TANTRAMAR MARSH-STANDARD OPERATING PROCEDURE (SOP) FOR WIND

SOCIAL AND ECONOMIC BENEFITS

- WSP's recommendations:
  - reduce number of wind events from 52 to 30 over a 27-month period without increased risk to the travelling public.
  - cautionary message would be posted on roadway signage allowing the truck driver to decide whether to divert based on their load.
  - reduce need for additional resources from multiple agencies in the event of closures.
- WSP's recommendations should reduce unnecessary advisories that can impede traffic and goods movement, without any increased risk to the travelling public.

wsp

project

ROUTE 144 CULVERT EMERGENCY DESIGN, TENDER & REHABILITATION

OVERVIEW

- Complete work required for the project expediently to open the roadway back up for the winter.
- Stabilize the embankment and avoid any possible failure of the roadway, and the downstream CN rail line.
- Timeline for tender, award and completion was unprecedented.
- Embankment failure occurred October 17, 2020 and the project was completed December 21, 2020.

project

ROUTE 144 CULVERT EMERGENCY DESIGN, TENDER & REHABILITATION

EXCELLENCE AND INNOVATION

- Drone technology used to gather pertinent survey data.
- Laser scanning used to ensure size, fit, design flows, and no further potential for collapse.
- Contractor reacted quickly after a severe rainfall event flooded the site during construction.
- **New repair option**: maintain existing concrete invert underneath the new culvert, and pour CLSM to fill annular space underneath.
- Unlike conventional lining, this method involved uplift and buoyancy issues that had to be balanced for CSLM to cure.
- Curing required specialized tenting and heating to be installed.

project

ROUTE 144 CULVERT EMERGENCY DESIGN, TENDER & REHABILITATION

DIVERSITY AND INCLUSION

- Expedited tendering involved consultation between many parties to bring this project to completion including:
  - NBDTI District 6 staff and operations;
  - NBDTI Executive staff;
  - Communities of St. Leonard and Grand Falls;
  - New Brunswick Department of Environment and Local Government (NBDELG);
  - Department of Fisheries and Oceans (DFO);
  - CN Rail line;
  - Local Members of the Legislative Assembly (MLA); and
  - Potential Bidders.

project

ROUTE 144 CULVERT EMERGENCY DESIGN, TENDER & REHABILITATION

SOCIAL AND ECONOMIC BENEFITS

- Opening of the roadway after reconstruction eliminated road closure and traffic detour which had inconvenienced local and regional traffic.
- Stabilization of the embankment reduced risk of roadway and CN rail line failure that would have been detrimental to the economic trade corridor in the area.
- By stabilizing the embankment, WSP helped prevent significant debris from entering the watercourse downstream, which would have impacted the natural environment.

project

BRIDGEDALE BOULEVARD PHASE 1, RIVERVIEW, NB

OVERVIEW

- Increased demand for east-west arterial corridor that would provide residents with direct link to Gunningsville Boulevard and the commercial area in central Riverview.
- Design of the road cross-section and two roundabouts needed to account for future twinning, which required special attention to the cross-section design.
- Road was designed to accommodate 2 additional lanes, curb and gutter and a concrete median without disturbing the existing lanes or trail.
- Project included construction of a roundabout on Gunningsville Boulevard, an existing north-south arterial road.

project

BRIDGEDALE BOULEVARD PHASE 1, RIVERVIEW, NB

EXCELLENCE AND INNOVATION

- First roundabouts constructed in Town.
- Gunningsville Blvd. roundabout provides traffic-calming on street where motorists typically travel at high speeds.
- Project led Town to consider more roundabouts in the future.
- Separate tree-clearing contract had to be issued to have 10.3ha of land cleared prior to start of migratory bird-nesting season in April.
- Culverts were installed in strategic locations to act as future storm sewer outfalls.
- Analysis of traffic volumes with reduced travel because of Covid were completed to determine if Gunningsville Blvd. could be temporarily closed to expedite construction.

project

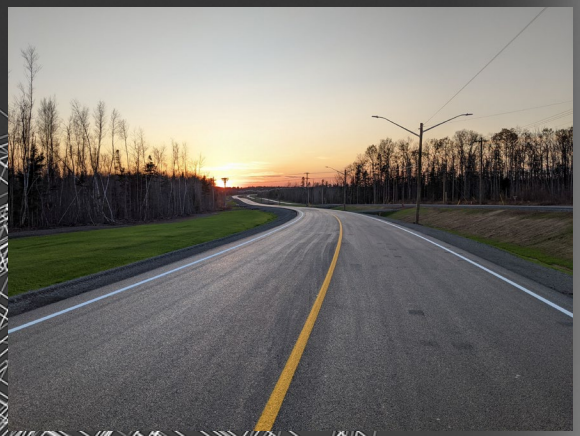
BRIDGEDALE BOULEVARD PHASE 1, RIVERVIEW, NB

DIVERSITY AND INCLUSION

- Multiple stakeholders engaged throughout design/construction of the project:
  - Parks and Recreation Dept.;
  - Albert County ATV association; and
  - Adjacent land developers.
- Diverse Consultant team included municipal, transportation/AT, electrical, landscape architecture, geotechnical and geomatics.
- Consultant committed to inclusive culture that respects contribution of employees with different backgrounds for the benefit of our clients, employees and wider communities.

project

BRIDGEDALE BOULEVARD PHASE 1, RIVERVIEW, NB



SOCIAL AND ECONOMIC BENEFITS

- Multi-purpose trail provides Active Transportation (AT) connection from Gunningsville Blvd. trail to Mill Creek Nature Park.
- Strategic link in Town's AT network providing connection to residential areas at Runneymeade Road for both recreational and utilitarian trips.
- Improving AT connections provides access to employment and services.
- Environmental advantages of roundabouts over traditional signalized intersections: reduce idling and vehicle emissions.
- Opens up land for commercial and residential development with access to the planned Wellness Centre.

project

HARVEY LAKE SEWER EXTENSION PHASE 2, HARVEY, NB

OVERVIEW

- Phase 2 of project designed to remove the point source pollution impacting water quality of Harvey Lake.
- This phase of the project included design and installation of central sewer collection system which would collect and divert sewerage from approximately 57 residences along the west side of Harvey Lake (Little Charlie Little Road and Bluffview Lane) to a central treatment facility.
- For years, effluent from existing on-site systems was breaking out and finding its way to the lake.

Englobe

project

HARVEY LAKE SEWER EXTENSION PHASE 2, HARVEY, NB

EXCELLENCE AND INNOVATION

- Unique challenges for project team:
  - **Multiple stakeholders**: project success was contingent on full collaboration.
  - **Flat topography**: required pressurized collection system including individual collection and pumping systems (STEP) for each property.
  - **Cherry Mountain**: only viable land for the project was pressurized system across Cherry Mountain to Village of Harvey's collection and treatment system.
    - Steep terrain and solid granite geology required a directional bore methodology.
    - Signal shot bore was more than 200m in length through solid granite and traversed an elevation change of 70m.
  - **Odor Control:** Twin air scrubber systems utilized to reduce probability of odor from central pump station and at the main force main discharge.

Englobe

project

HARVEY LAKE SEWER EXTENSION PHASE 2, HARVEY, NB

DIVERSITY AND INCLUSION

- Residents, Village of Harvey, province of NB and Englobe Corp together facilitated solution to a problem which directly impacted users of the Lake.
- Homeowners helped facilitate cooperation of Province, adjacent landowners and Village of Harvey.
- Adjacent property owners donated lands without compensation.
- Village of Harvey agreed to receive wastewater from an area outside their Village limits and operate the system in perpetuity.
- NB Southern and NBDTI were partners in permitting an easement across the rail line right of way and public roadway to facilitate connection to the Village system.
- If any stakeholders involved had not agreed to participate the project would not have moved forward.

Englobe

project

HARVEY LAKE SEWER EXTENSION PHASE 2, HARVEY, NB

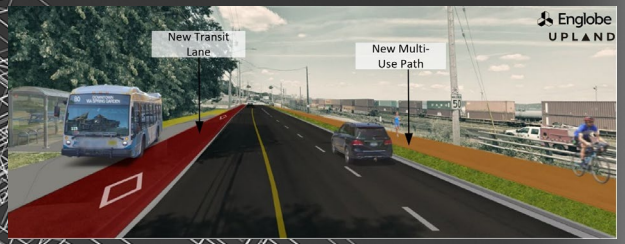
SOCIAL AND ECONOMIC BENEFITS

- **Most significant**: Elimination of 57 potential point sources of pollution of Harvey Lake.
- Long-lasting legacy for Lake's water quality and its use for recreation by residents along the Lake and the public who live in adjacent communities.
- Property values along the Lake will undoubtedly go up with the installation of a regulatory compliant collection system operated by the Village of Harvey.

Englobe

project

BEDFORD HIGHWAY FUNCTIONAL PLAN, HALIFAX, NS



OVERVIEW

- Bedford Highway-among the most important transportation corridors in HRM.
- Highly car-centric, lacked clear vision for its look, feel, and function.
- **Objective:** develop long-term corridor vision and examine how right-of-way could be better allocated to serve all modes of travel.
- **Recommended plan**: dedicated transit lanes, transit signal priority, improved transit stops, 9.5km of new multi-use trail, 2.2 km of new bike lanes, sidewalk extensions, new and upgraded crosswalks with median islands, and 20 intersection upgrades.
- Detailed preliminary drawings, class D construction cost estimate, phase implementation plan.

Englobe

project

BEDFORD HIGHWAY FUNCTIONAL PLAN, HALIFAX, NS

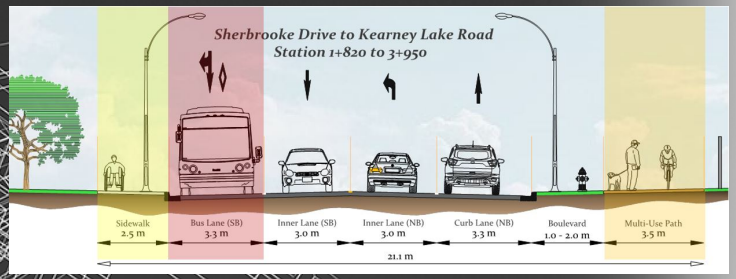
EXCELLENCE AND INNOVATION

- First “Strategic Corridor Study” that integrated transportation and land use planning.
- **Challenge**: constrained right-of-way limited the ability to accommodate all travel modes.
- Extensive analysis to select preferred configuration and demonstrate decision-making process to stakeholders and the public.
- First time “Multi-Modal Level of Service” (MMLOS) analysis was applied on this scale in HRM and Atlantic Canada.
- Performance-Based Design approach required.
- **Other design innovations**: transit signal priority technologies and intersection smart channels for pedestrian safety.

Englobe

project

BEDFORD HIGHWAY FUNCTIONAL PLAN, HALIFAX, NS



DIVERSITY AND INCLUSION

- Extensive public engagement program.
- Consultation with general public, community advocacy groups and technical stakeholders.
- Program included:
  - Four open houses attended by 200+ people;
  - 1200 people participated in public surveys; and
  - Multiple meetings with community advocacy groups.
- These groups provided direct input on designs with emphasis on safety for vulnerable road users and sustainable mobility.
- Engagement sessions were productive and positively received.
- Successfully built consensus and community support for the final recommendations and designs.

Englobe

project

BEDFORD HIGHWAY FUNCTIONAL PLAN, HALIFAX, NS

SOCIAL AND ECONOMIC BENEFITS

- 12km of continuous, protected, cycling facilities.
- Improved sidewalk widths, infill connections, and accessibility to link neighbourhoods and transit stops.
- 6 new/upgraded pedestrian crossings with improved technology and refuge islands.
- Smart channel designs at all intersections for improved pedestrian safety.
- 5% mode shift away from motor.
- Improvements expected to remove approximately 500 vehicles/day- an estimated annual reduction of 1.8 million vehicle-km and 500 tonnes of CO2eq (GHG emissions).

Englobe

project

MRS. DUNSTER'S FRESH-BAKED GOODS BAKERY LINE IN MONCTON, NB

OVERVIEW

- New baking line necessary to meet current and future demand for fresh-baked and frozen goods.
- Team helped identify site for 3 400 m^2, $4.5 million bakery line and developed conceptual design.
- Conceptual design: baking line, retail store, community room, offices, lunchroom, locker rooms, and washrooms for facility that would employ up to 60.
- Size of spaces and corridors were increased to account for social distancing required during the global pandemic.
- Team oversaw construction to ensure systems were installed as per design specifications.

FUNDY Engineering

project

MRS. DUNSTER'S FRESH-BAKED GOODS BAKERY LINE IN MONCTON, NB

EXCELLENCE AND INNOVATION

- First bakery of its size developed in Atlantic Canada in 20+ years.
- **Challenge**: delivery times of mechanical and electrical equipment.
- Achieved without compromising project quality, building code compliance, or worker safety.
- REVIT 3-D modelling of the space ensured equipment would fit in space provided.
- Non-destructive testing by scanning concrete floor slab to identify location and size of rebar.
- Engineered analysis to demonstrate steel members met fire code requirements.
- Floor layout designed to ensure adherence to fire code egress distances around bakery equipment.

FUNDY Engineering

project

MRS. DUNSTER'S FRESH-BAKED GOODS BAKERY LINE IN MONCTON, NB

DIVERSITY AND INCLUSION

- Collaborative approach used to ensure all moving pieces were designed to fit.
- Participants: Fundy Engineering (8 team members), Anderson Architects (1 team member), CTS Structural (2 team members), RJ Bartlett (1 team member), Iron Maple (4 team members), Cinelli (4 team members), Mrs. Dunster's (4 team members), various trades, and City of Moncton building inspection department.
- Ability of team members to trust one another, and relying on experienced professionals, enabled project to be successful.

FUNDY Engineering

project

MRS. DUNSTER'S FRESH-BAKED GOODS BAKERY LINE IN MONCTON, NB

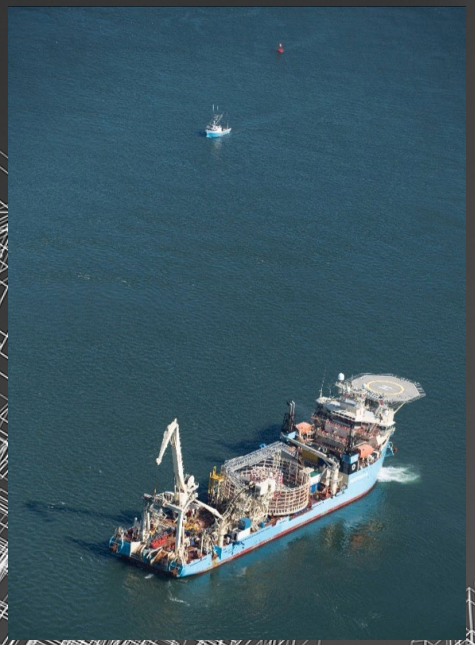
SOCIAL AND ECONOMIC BENEFITS

- Consolidated two bakeries into one in a better location to serve the market and provide fresh product daily.
- Addition of retail space will help other nearby and complimentary food-related businesses.
- Continued revitalization of St. George Boulevard.
- Employment for engineers and tradespeople during construction phase and permanent employment of up to 60 during operations.
- Reduce region's need to import frozen product.
- Growth of New Brunswick-based, locally owned company helps foster business expansion, scaling, and entrepreneurship.

FUNDY Engineering

project

FUNDY ISLES SUBMARINE CABLE, DEER ISLAND



OVERVIEW

- To get clean, reliable energy out to the islands.
- **Project scope**: install new 69kV AC three-core submarine cables capable of withstanding extreme tides, high currents, rocky seabeds, and heavy scallop/lobster fishing in the area.
- Submarine cable design included embedded fibre optic cable for future uses.
- Extremely cold water, high currents, water depths greater than 30m and uneven seabed presented challenges in design and installation.
- Cable design included double layer of steel armour to mitigate risk posed by heavy scallop dragging and lobster fishing activities in the area.

Stantec

project

FUNDY ISLES SUBMARINE CABLE, DEER ISLAND

EXCELLENCE AND INNOVATION

- Second layer of steel armour was included in cable design to mitigate risk of scallop dragging and lobster fishing.
- Horizontal directional drilling was used where possible due to rocky cliffs and pristine shorelines.
- Allowed for extension of submarine cable offshore to a low tide depth of 3m, protecting the cable from vessels and from high water currents near shoreline.
- Open cut trenching was utilized where necessary at landfall approaches.
- Uneven seabed resulted in submarine cable being suspended between ridges exposing it to vortex induced vibration that risked cable failure. Installation was complicated by extreme variations in tide levels, currents and presence of marine wildlife including whales.

Stantec

project

FUNDY ISLES SUBMARINE CABLE, DEER ISLAND

DIVERSITY AND INCLUSION

- Throughout the multi- year project, Stantec worked with NB Power to ensure all stakeholders were kept informed about the cable routing and the project schedule.
- Numerous public meetings held with local fishing associations and local government representatives as well as consultation with several Indigenous groups with interests in the Fundy Isles.

Stantec

project

FUNDY ISLES SUBMARINE CABLE, DEER ISLAND

SOCIAL AND ECONOMIC BENEFITS

- New and more robust cable design improved reliability of this vital power supply to the Fundy Isles.
- Fibre optic cable included in design provides future opportunities for the Fundy Isles.
- Environmental impact assessment completed and updated as required over life of the project.
- Having this link to the mainland offers Fundy Isles a more environmentally friendly energy supply option than running their diesel fueled generation assets would achieve.

Stantec

project

PROJECT TIGER, GREENFIELD THROUGH-AIR-DRIED (TAD) TISSUE PRODUCTION PLANT-MACON, GEORGIA

OVERVIEW

- Irving Consumer Products (ICP) sought to build state-of-the-art tissue plant to meet increased demand for bath tissue and paper towels.
- **Scope of work**: environmental services, process development, equipment specification/selection, and detailed design (structural, civil, mechanical, and electrical).
- Leveraged company strength in collaborative project design.
  - Early start up of tissue converting equipment using parent tissue rolls manufactured at another ICP Plant.
  - Rigorous quality procedures employed to minimize potential errors.
  - Worked closely with contractor to resolve questions so project proceeded at pace.

Stantec

project

PROJECT TIGER, GREENFIELD THROUGH-AIR-DRIED (TAD) TISSUE PRODUCTION PLANT-MACON, GEORGIA

EXCELLENCE AND INNOVATION

- Tissue machine is an Advantage THRU-AIR Dry (TAD) machine (largest the supplier has produced).
- Stantec's collaboration tools and processes were supported by our IT and communications infrastructure. Key successes include:
  - Training, development, and mentoring team leads.
  - Development of optimized work packages.
  - Development of comprehensive 3D model for all engineering disciplines.
  - Model was used to share engineering progress with team members and client to facilitate timely feedback and input in optimizing the design process.

Stantec

project

PROJECT TIGER, GREENFIELD THROUGH-AIR-DRIED (TAD) TISSUE PRODUCTION PLANT-MACON, GEORGIA

DIVERSITY AND INCLUSION

- Stantec has a strong corporate diversity culture that includes elements to attract and attain high quality employees.
- At project's peak, 190 people were working from 40 different Stantec offices located in several Canadian provinces and U.S. states.
- Our diverse team included women in roles critical to project success including:
  - Project Architect;
  - Project Lead Technologist;
  - Project Controller;
  - Lead Pump Design Engineer;
  - Civil Engineering Lead;
  - Permitting Lead;
  - Designers;
  - Drafters; and
  - Document Controller.

Stantec

project

PROJECT TIGER, GREENFIELD THROUGH-AIR-DRIED (TAD) TISSUE PRODUCTION PLANT- MACON, GEORGIA

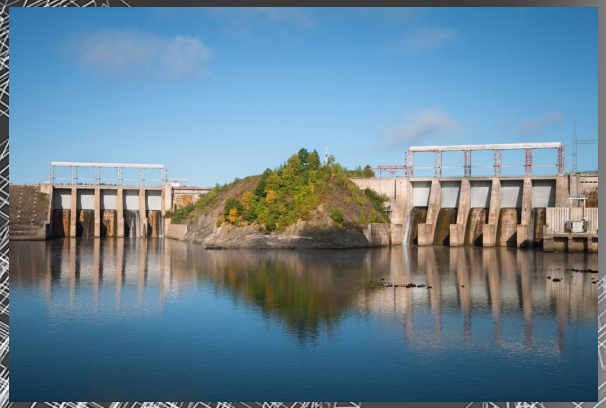
SOCIAL AND ECONOMIC BENEFITS

- Environmental- tissue products are recyclable, reducing environmental impacts.
- Tissue mill in Georgia provided jobs for several thousand during design and construction and permanent jobs for many people.
- Social and economic benefits of the plant will be felt for years to come both in New Brunswick and Georgia.
- Engineering design was fully (more than 95%) managed by UNB engineering graduates. This illustrated high standards of New Brunswick education system and potential of locally trained engineers.

Stantec

project

MACTAQUAC LIFE ACHIEVEMENT PROJECT (MLAP): COMPREHENSIVE CONDITION ASSESSMENT (CCA), MACTAQUAC, NB



OVERVIEW

- Mactaquac Generating Station originally designed to operate for 100 years.
- Premature concrete deterioration due to Alkali Aggregate Reactivity (AAR).
- Stantec completed CCA report of entire Mactaquac hydro generating facility (excluding hydro turbines, generators, earthen dam, unit transformers and sub-station).
- Leveraged variety of industry tools and approaches to develop unique approach and methodology to account for effects of AAR in establishing the condition of various structures, equipment, and systems.

Stantec

project

MACTAQUAC LIFE ACHIEVEMENT PROJECT (MLAP): COMPREHENSIVE CONDITION ASSESSMENT (CCA), MACTAQUAC, NB

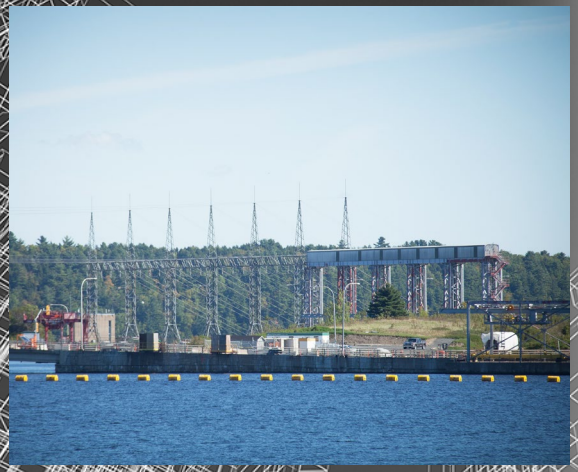
EXCELLENCE AND INNOVATION

- Performed condition assessment for situation not readily captured by pre-established methodologies.
- **Technical innovation**: development of unique condition assessment methodology incorporating effects of AAR.
- Required profound understanding of original design along with present and future service expectations from the plant.
- Specialized expertise in concrete engineering for hydroelectric structures affected by AAR.
- Mechanical and electrical engineering know-how to understand original design in context of present-day service requirements.
- Deep knowledge of geotechnical and hydrotechnical aspects of large dams.

Stantec

project

MACTAQUAC LIFE ACHIEVEMENT PROJECT (MLAP): COMPREHENSIVE CONDITION ASSESSMENT (CCA), MACTAQUAC, NB



SOCIAL AND ECONOMIC BENEFITS

- Environment- station produces electricity without harmful air emissions or residual waste.
- Critical balance to grid through its ability to quickly adjust output and more effectively incorporate wind and solar power.
- Responsibility to manage its waters for benefit of First Nations communities, the aquatic environment, communities affected by water level changes and flooding, and the people of NB.
- Assessment determined condition of structures, equipment, and systems throughout the plant and now forms basis to scope the Mactaquac Life Achievement project.
- Pivotal for plant to continue safely generating to the end of its original design life (2068) and maximizing its value to New Brunswickers.

Stantec

project

MACTAQUAC LIFE ACHIEVEMENT PROJECT (MLAP): COMPREHENSIVE CONDITION ASSESSMENT (CCA), MACTAQUAC, NB

OUTSTANDING COLLABORATION

- Close collaboration between Stantec and exp subject matter experts and other consultants engaged by NB Power along with Mactaquac's maintenance, operations, and engineering team members.
- Ensured all perspectives, information, and field conditions were included in development of the condition assessment.

Stantec