

**Pacific Liaicon and Associates Inc. and
McElhanney Consulting Services Ltd.
Rail/Train Experience
September 29, 2008**

Corporate Experience

The rail/train experience of Pacific Liaicon, its parent company, SNC-Lavalin, and McElhanney is described first, as the experience of individual working team members can be readily augmented with resources within these companies.

Pacific Liaicon and Associates Inc. (A Division of SNC-Lavalin)

Pacific Liaicon specializes in project management and management consulting, often acting as Owner's Representative. Pacific Liaicon's rail/train experience is summarized below.

Advanced Light Rapid Transit System in Metro Vancouver

Rapid Transit Project 2000 – Independent Review of Guideway Construction Issues (June/July 2000) – One-month assignment to review the status of the guideway contract, the stations and the Bombardier agreements committed on the New Westminster to Vancouver SkyTrain Project. The purpose of the review was to conduct an independent assessment of these contracts and to recommend the best course of action to ensure completion of guideway construction within the project budget and schedule. (Client: Rapid Transit Project 2000 Ltd.)

Rapid Transit Project 2000 – Preliminary Review (March 1999) – Two-week assignment to conduct a preliminary review of the SkyTrain extension project (Rapid Transit Project 2000), focusing on project management structure, control and reporting systems, risk assessment and procurement and contracting strategies. This included preliminary assessment of items such as project schedule and risks, the Vehicle Purchase Agreement and related negotiations. (Client: Crown Corporation Secretariat, BC Ministry of Advanced Education, Training & Technology and Treasury Board, BC Ministry of Finance and Corporate Relations)

Advanced Light Rapid Transit System (SkyTrain) (1983-1987) – Contracted by the Deputy Minister of Finance to provide consulting and management services for the design development and construction of the SkyTrain prior to commencement of Expo 86. Stayed on to advise on expansion and management structuring. (Client: BC Transit)

[Note: These assignments were undertaken prior to purchase of the company by SNC-Lavalin in 2001.]

Rail/Train Experience

North East Coal Development, Tumbler Ridge, B.C. (1981-1984) – Development manager responsible for monitoring and coordinating the schedule and budget of the four major provincial infrastructures:

B.C. Rail – Tumbler Ridge Branch Line

B.C. Hydro – 230 kV Transmission Line and Substation
Ministry of Highways – Chetwynd to Tumbler Ridge Highway
Ministry of Municipal Affairs – Townsite of Tumbler Ridge

SNC-Lavalin Inc.

SNC-Lavalin's Mass Transit Group specializes in the efficient, cost-effective delivery of rail-based rapid transit projects, particularly light rail, conventional heavy rail and advanced automated systems. SNC-Lavalin has worldwide experience in developing rail transit systems, and an established international network of permanent offices, allowing for both local knowledge and global scope. SNC-Lavalin can provide services for all phases of its clients' projects, including planning, financing, design, systems integration, project management, construction, testing, commissioning, operations and maintenance.

Advanced Light Rapid Transit System in Metro Vancouver

[Project Fact Sheets available on request.]

Canada Line Rapid Transit System – SNC-Lavalin is responsible for the design, construction, partial financing and operation of the Canada Line, an 19-km automated light rail line linking downtown Vancouver, Richmond and the Vancouver International Airport and connecting with existing transit services. The system includes an underground tunnel through Vancouver, an elevated guideway over the Fraser River to Richmond, 16 stations and an operations centre.

Advanced Light Rapid Transit System (SkyTrain) – SNC-Lavalin has been a key player in the development, project management, design and construction of the SkyTrain system, from Phase I in the 1980s through to the Millennium Line Extension in 2002. Vancouver's SkyTrain system marked the world's first use of elevated guide ways in urban areas. SNC-Lavalin played a key role throughout the development, project management, design and construction of all three completed phases of this 29-km, fully automated system. The system is composed of elevated, at-grade and depressed sections and features an elevated guideway that is fully integrated with the mechanical and electrical systems. SNC-Lavalin oversaw the project and design management of SkyTrain's initial phases and held key positions within the project office. SNC-Lavalin's scope of work included detailed design of five stations and five km of guideway; conceptual design and route alignment studies for Phase II; and alignment design during Phases II and III. (Client: British Columbia Rapid Transit Company Ltd.)

Selected Other Mass Transit Systems

Montreal Metro Line 2 Extension to Laval – SNC-Lavalin led the consortium responsible for extending Metro Line 2 by 5.5 km to the City of Laval. The work includes the construction of a 5.2 km tunnel with 400 m under the river, three stations, eight auxiliary structures, an underground garage, a fire protection training centre, two bus stations and parking lots. (Client: Agence Métropolitaine de Transport)

Kuala Lumpur LRT-2 System, Malaysia – SNC-Lavalin managed all electrical and mechanical works; supplied and installed a traction-power system; a guideway, track work and a power rail; and designed and built a 500 m tunnel/portal, 29.4 km of pre-cast cable tray and two underground stations.

Guangzhou Metro Line 4 Transit Technology Review and Conceptual Design – SNC-Lavalin undertook a transit technology review for Guangzhou Metro Line 4, the first system in China to potentially use linear induction motor (LIM) technology. This was followed by preparation of vehicle specifications and conceptual design for the 62 km, 20-station line.

McElhanney Consulting Services Ltd.

McElhanney has worked directly on many BC Transit, Translink or closely related projects, including: SkyTrain, commuter rail, bus exchanges and rapid transit. The following are examples of McElhanney's transit experience in the past couple decades:

Advanced Light Rapid Transit System in Metro Vancouver

Canada Line (with SNC Lavalin) – McElhanney assisted in finalizing the primary track alignment and pier locations, traffic management plans, utility design, road interface design, construction supervision and inspection, base mapping, survey control, bridge and tunnel, alignment/monitoring.

Expo Line – McElhanney prepared: base mapping, primary survey control; designed: utilities relocation, rail relocations, bus loops, parking facilities, property acquisition; and provided: construction primary alignment, tunnel and bridge alignment, dimensional quality assurance and pier, guideway and rail alignment/layout, and performed the assistant resident engineer role for the construction of these components.

Millenium Line (with SNC Lavalin) - base mapping, survey control, some station layout, some traffic management during construction.

Evergreen Line – Tom Hunt, McElhanney's Surrey branch manager, participated on the steering committee representing Port Moody; McElhanney's survey division provided base mapping and survey control.

Operations and Maintenance Centre Expansion – base mapping with utilities, buildings and rails.

Commuter Rail

West Coast Express – preliminary design of seven stations including bus loops, parking lots, Kiss & Ride, bus operations liaison, railway/street interfaces, property impacts and transit exchange and parking facilities.

Bus Exchanges and Rapid Transit

Scott Road Exchange – Design of an eleven-bus exchange with 1400 vehicle Park & Ride facility and connection to elevated SkyTrain.

Surrey Central Transit Exchange – Managed the design of a 16 bus exchange at the Surrey Central SkyTrain station.

Working Team Experience

Henry Wakabayashi

Pacific Liaison and Associates Inc., Vancouver, BC

Rapid Transit Project 2000 – Independent Review of Guideway Construction Issues (June/July 2000) – Project Manager on this assignment.

Rapid Transit Project 2000 – Preliminary Review (March 1999) – Project Manager on this assignment.

Advanced Light Rapid Transit System (SkyTrain) (1983-1987) – Owner's Representative for the BC Government on the first phase of SkyTrain.

North East Coal Development, Tumbler Ridge, B.C. (1981-1984) – Project Director overseeing BC Rail's construction and operation of a new 430 km electric and later diesel train service between Tumbler Ridge and Prince George (Tumbler Ridge Branch Line) to export North East Coal.

Ready access to SNC-Lavalin expertise.

David Leather

SNC-Lavalin Inc., Vancouver, BC

Manchester (UK) Metrolink Extension Proposal (2001-2003) – Responsible for design and construction works as part of the bid submission to extend the existing 37 km Metrolink Tram system by 55 km.

Manila (Philippines) Light Rail Transit Extension (2000-2001) – Responsible, locally, for engineering works in a submission to extend the existing LRT Line 1 in a joint venture agreement with the Light Rail Transit Authority.

UMA, Calgary, AB (1982-1990)

Canadian Pacific Railway Bridge in Banff National Park – Design of railway bridge with four-span, cast-in-place, post-tensioned concrete deck.

Reid Crowther & Partners Ltd., Calgary, AB (1981-1982)

Design of Light Rail Transit Bridges

Ready access to SNC-Lavalin expertise.

Tom Tasaka

Ready access to SNC-Lavalin expertise.

John Kitson

Ready access to SNC-Lavalin expertise.

Grant Miyasaki

SNC-Lavalin Inc., Vancouver, BC

Canada Line Rapid Transit Project (2005-present): Design Manager for the Operations and Maintenance Centre (OMC) covering the main OMC building, TPS buildings, wheel lathe building, vehicle wash facility, gatehouse and site civil works and underground service connections. Responsible for overall management of OMC design, including functional planning and design development of OMC, multi-disciplinary design coordination with electro-mechanical systems, liaison with Operating Company, management of design consultants, tender of construction packages and technical support during construction.

Beijing Metro Airport Rail Line Advisory Services, Beijing, China (2005): Engineering Expert providing advisory services on civil planning of airport rail links and LIM system applications. Reviewed design proposals and conducted seminars on guideway construction methods, track systems, and program management. Client: Beijing Urban Engineering Design and Research Institute.

Beijing Olympic Rail Line Pre-Feasibility Study, Beijing, China (2002), Project Manager: responsible for preparation of planning studies for a 5 km mass transit rail line to the site of the 2008 Olympic Games. Developed system plan, including development and evaluation of route options, investigation and provision of advice on key planning issues, formulation of decision process and presentation of transit planning experience in other countries. Client: Beijing Mass Transit Railway Group Co. Ltd.

Manila LRT Line 1 Extension Project Development, Manila, Philippines (2000 and 2001), Planning and Technical Approvals Coordinator: responsible for planning and technical approvals of a 12 km light rail transit system in Manila. Lead technical representative of the project responsible for communication and liaison with various government departments and authorities to secure technical approvals.

- Responsible for performing technical analysis, resolution of technical issues and presentations to various government authorities/committees to effectively address all concerns. Successfully obtained endorsement of city councils and approvals on traffic management plan, public transport service integration plan, alignment, public property easement, resettlement plan and environmental compliance certificate.
- Led the property acquisition team and managed consultants for ridership forecast, hydraulic studies, traffic studies, community relations and environmental impact assessment.
- Manila LRT Line 1 Extension Proposal, Manila, Philippines (1999), Proposal Manager: responsible for overall management of proposal for implementation and operation of a 12 km light rail transit line in Manila. Prepared technical plan and provided overall coordination of proposal preparation.

Tianjin Metro Extension Pre-Feasibility Study, Tianjin, China (1999), Project Manager: responsible for preparation of pre-feasibility study for a 23 km extension of an existing metro line in Tianjin. Prepared a transit system plan including route evaluation, ridership

estimate and technology selection, and coordinated financial viability activities. Client: Starwell China Investment Group.

Manila LRT Line 1 Extension Feasibility Study, Manila, Philippines (1998), Technical Manager: responsible for the management of the transportation feasibility study for a 12 km light rail transit in Metro Manila. Included overall technical responsibility for transportation planning activities including route location, ridership forecast and conceptual design of fixed facilities. Other activities/responsibilities: coordination of local sub-consultants, development of study recommendations, administration of study, presentations to local government units and preparation of study report. Client: Light Rail Transit Authority.

South Metro Manila LRT Pre-Feasibility Study, Manila, Philippines (1998), Project Manager: responsible for preparation of pre-feasibility study for a 17 km light rail transit line in Metro Manila. Prepared a transit system plan including needs assessment, ridership estimate, route evaluation and technology selection. Client: Department of Transportation and Communications of the Philippines.

Panama Light Metro Pre-Feasibility Study, Panama City, Panama (1998), Project Manager: responsible for preparation of pre-feasibility study for a 15 km light rail transit system in Panama City. Prepared a transit system plan including needs assessment, ridership estimate, route evaluation and technology selection. Client: National Transportation Committee of Panama.

JinBin Expressway Feasibility Study, Tianjin, China (1996), Project Manager: responsible for coordination and technical direction for the detailed transportation feasibility study of a 50 km toll expressway in Tianjin, China. Coordinated the work of team members and sub-consultants, reviewed and assimilated findings and results, formulated recommendations and strategies and provided liaison to the client. Performed key technical activities including traffic forecasting, conceptual planning, preparation of study reports and presentations to various bureaus of the municipal government. Client: Tianjin Mass Transit (Group) Development Co., Ltd.

Ready access to other SNC-Lavalin expertise.

Lavalin (formerly Fenco Consultants Inc.)

Singapore LRT System Demand Forecast and Viability Study, Singapore (1995), Transportation Engineer: provided management, coordination and technical direction of a financial viability study and performed ridership forecasts, facilities planning and conceptual design. Special features: developed work program, assimilated work of study team members and sub-consultants, summarized study findings and formulated recommendations and strategies. Client: Mass Rapid Transit System of Singapore.

Scarborough Rapid Transit Extension Project, Scarborough, Ontario (1994), Transportation Engineer: prepared needs assessment, justification and technical reports on evaluation of station locations. Special features: conducted ridership forecasting and wrote technical specifications for procurement of the fare collection system equipment. Client: Toronto Transit Commission.

Ankara Metro Rapid Transit Project, Ankara, Turkey (1991), Transportation Engineer: conducted passenger flow analysis to establish emergency egress requirements in accordance with NFPA guidelines and the preliminary design of station signage. Special

features: prepared technical specifications for the fare collection system equipment and participated in negotiations with vendors. Client: Ankara Metro Consortium.

Bangkok Mass Rapid Transit Project, Bangkok, Thailand (1991), Transportation Engineer: conducted passenger flow analysis for sizing of station elements. Special features: investigated alternative alignment concepts and evaluated fare collection system proposals. Client: Expressway and Rapid Transit Authority of Bangkok.

Santino Pirillo

Ready access to McElhanney expertise.

Gregg Singer

Ready access to SNC-Lavalin expertise.