OTTAWA LIGHT RAIL TRANSIT PROJECT:
TUNNEY’S PASTURE TO BLAIR STATION

BC CONSTRUCTION ROUNDTABLE / NOVEMBER 21, 2013
1. Introduction to RTG
2. Proposal phase
3. Overview of Confederation Line
   - Overall Project Description
   - Tunnel
   - Vehicle and Train Construction
   - Maintenance and Storage Facility (MSF)
   - Stations
4. Comparison with Canada Line
5. Current status
6. Questions
# Introduction to RTG

## Engineering Joint Venture (EJV)

<table>
<thead>
<tr>
<th>Architects (Stations, MSF)</th>
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<tr>
<td>bbb architects</td>
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<td>IBI GROUP</td>
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<th>Fire and Life Safety (System-Wide)</th>
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<th>Structural Design (Above Ground Stations)</th>
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<th>Geotechnical Design (System-Wide)</th>
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<tr>
<th>Structural Design (Downtown Tunnel)</th>
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<tr>
<td>Hatch Mott MacDonald</td>
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<th>Other Specialists</th>
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<tr>
<td>- Betty Dion (Accessibility)</td>
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<td>- Terry Heard (Signage &amp; Wayfinding)</td>
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<td>- Cliff Ailing (Vertical Circulation)</td>
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<td>- ATS (Noise &amp; Vibration)</td>
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<td>- RWDI (Climate)</td>
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<td>- TLS (Lighting)</td>
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Introduction to RTG

World Class Expertise & Local Knowledge

More than 80 large-scale transportation projects

More than $13 billion in work in North America in the last three years

More than 1,360 km of tunnel

More than 2,500 km of rail/mass transit projects
The reason for LRT

• Ottawa’s BRT system is a very busy rapid transit system

• The conversion of the central section from Tunney’s Pasture to Blair will have an impact on a large number of Ottawa residents who use it every day

• Bus volumes are in the order of 180 to 200 per hour per direction in peak hours

• Passenger volumes are as high as 9,000 passengers per hour per direction

• Buses stack up on down town streets in rush hour
Overview of Proposal Phase

**Project At a Glance**

- Design, Build, Finance and Maintain
- 5-year DB, 30-year Maintenance
- Phase 1 is first of several planned phases to convert BRT to more than 40 km of LRT lines
- Affordability ceiling: $2.075 B (including financing)
- 25% Canadian content for LRV
- Vehicle supplier required in RFP stage
- Nation’s Capital - Signature Project
Overview of Proposal Phase

Scope of Design and Construction

- 13 Stations (10 at grade and 3 underground)
- 10km Guideway (Civil Works, Structures, Trackwork)
- 2.5km Tunnel
- Low-Floor Vehicles and Systems (Train Control, Communications, OCS, Traction Power, CCTV)
- Maintenance and Storage Facility
- Highway 417 widening (Construction only)
Overview of Proposal Phase

Unique Challenges

• Procurement process (IO/design reviews)
• 1st light rapid transit project for Ottawa
• System to be expandable in future
• Project is a renovation of existing BRT
• Maintaining Transit use during construction
• Ottawa’s unique vehicle specifications
• High Station expectations and NCC
Overview of Proposal Phase

Unique Challenges (contd.)

- Tunnel underneath downtown Ottawa
- Noise and vibration
- Contamination
- LRT drivers provided by Ottawa
- Climatic Conditions
- Over 20 addendum (including adding highway work, changing affordability cap and becoming less prescriptive)
Overview of Proposal Phase

Tough Competition


• Rideau Transit Partners (RTP) led by Bouygues Travaux Publics S.A., with Brookfield Financial Corp., Fiera Axium Infrastructure Canada LP, Parsons Enterprises Inc., Parsons Canada Ltd., Colas Rail S.A. and Johnson Controls L.P. as prime team members. Others: Stantec, GZA Environmental, Aedos
RTG Winning Strategies

• **Only team** to have completed a P3 Transit Project in Canada;

• Made up of **leading design, construction and operations & maintenance companies** in transit in Canada;

• Partners are **represented in every level** of team;

• Manufacturing strategy will **exceed the Canadian content** requirements with added benefit of assembling the trains in Ottawa.

• **Iconic public architecture** designs are fitting for the nation’s capital.
Overview of Confederation Line

Construction Staging

- Highway 417 Widening
- Maintenance and Storage Facility
- Underground Tunnel
- East Section
- Central Section
- West Section
Approach to Design of Tunnel

- Pedestrian and vehicular access to existing buildings must be maintained at all times
- Complex array of utilities that are not easily diverted and must be supported across excavation
- Very narrow right-of-way; need to stay clear of adjacent building basement foundation walls
Approach to Design of Tunnel

- Traffic and Transit Management
- Noise and Vibration Mitigation
- Geotechnical Risk
- Minimize disruption to adjacent properties
- Therefore chose Mining approach (**Ottawa method**)
Benefits of RTG “Ottawa Method“

- Reduced traffic impacts
- Reduced bus operations impacts
- Reduced business operation impacts
- More efficient station design
- Substantial reduction of utility impacts
- Greater Control over construction methods
- Tunneling from three locations to minimize schedule impacts
Overview of Confederation Line

Approach to Design of Tunnel

Two Excavation Types – Station & Running Tunnel
Overview of Confederation Line

Approach to Design of Tunnel

Benefits of Roadheader over TBM

• Adjust to any Excavation Shape and Rock Conditions

• Short Tunnels do not Justify Investment in TBM

• 3 to 6 months Mobilization, TBM from 12 to 16 months
Overview of Confederation Line

Vehicles
Overview of Confederation Line

Train Control

• Thales has the largest number of installed CBTC systems of any company in the world
• System is capable of running unattended train operation (UTO) mode but will normally operate in automatic train operation (ATO) mode with drivers, with capabilities of running in automatic train protection manual (ATPM) mode in cases of emergency or for atypical operational situations
Overview of Confederation Line

Maintenance and Storage Facility (MSF)

Overarching Principles

- Safety and security
- Integration with transit network
- Efficient layout
- Site that is flexible and expandable
- Accessible
- Sustainable design
- Being a good neighbour
System-Wide Approach to Station Design

- Design based on ridership demand and contextual fit
- Optimized platform sizing to suit all scenarios including ultimate
- Developed iconic architecture with consistent identity
- Stations optimized for full range of activities
Factors Affecting Ridership Demands

- Special Events (Canada Day)
  - Crowd Management
- University Campus
  - Exaggerated peaks during a.m. peak
- Off-Peak Factors
  - Shopping Malls
  - Commuter Rail (VIA) Schedules
- Factors Affecting Growth and Demand
  - Future Extensions to Transit Network
  - Zoning and Planning By-law amendments
  - Land Use Policies
  - Economy – price of gas, insurance, etc.
Overview of Confederation Line

Stations – Tunney’s Pasture
Overview of Confederation Line

Stations – Blair
Overview of Confederation Line

Stations – Bayview
Overview of Confederation Line

Stations – Parliament (formerly Downtown East)
## Canada Line vs Confederation Line

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<thead>
<tr>
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<th>Canada Line</th>
<th>Confederation Line</th>
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<tbody>
<tr>
<td><strong>Length</strong></td>
<td>18.5 KM</td>
<td>12.5 Km</td>
</tr>
<tr>
<td><strong>Stations</strong></td>
<td>18 (9 U/G)</td>
<td>13 (3 U/G)</td>
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<tr>
<td><strong>Tunnel</strong></td>
<td>9 Km (TBM + C &amp; C)</td>
<td>2.5 Km (SEM)</td>
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<tr>
<td><strong>Technology</strong></td>
<td>Metro Vehicle</td>
<td>100% Low Floor</td>
</tr>
<tr>
<td><strong>Power System</strong></td>
<td>Power Rail</td>
<td>Overhead Catenary</td>
</tr>
<tr>
<td><strong>Drivers</strong></td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Contract</strong></td>
<td>P3-F,D,B,M,O</td>
<td>P3-F,D,B,M</td>
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<tr>
<td><strong>Ridership</strong></td>
<td>6,600 → 15,000 pphpd</td>
<td>10,700 → 24,000 pphpd</td>
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<tr>
<td><strong>Climate</strong></td>
<td>Benign</td>
<td>Cold/Snowy or Hot/Humid</td>
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Canada Line vs Confederation Line
Current Status

Highway 417 – Bid-Build Only
Current Status

West Portal
East Portal

Current Status
Intermediate Shaft

Current Status
Current Status

Running Tunnel
Gold Award for Transportation Innovation

• Project Recently won Gold Award for Transportation Innovation from the Canadian Council for Public-Private Partnerships
OTTAWA LIGHT RAIL TRANSIT PROJECT:
TUNNEY’S PASTURE TO BLAIR STATION

Any Questions?
Thank You – Merci