Glenmore Trail / 37th Street SW Interchange

CSCE Presentation
March 17, 2011

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Happy Saint Patrick’s Day
Presentation Outline

1) Project Planning
2) Short-term Solutions
3) Design / Tender Phase
4) Bridge Innovations
5) Fast-track Construction
Project Planning

- SWRR Referendum – June 30, 2009

Tsuu T’ina reject Calgary ring road deal

More than 60 per cent of voting members cast ballots against deal
Planning Timelines

• July 5, 2009 – Council motion on G37
• July 15, 2009 – Project kick-off meeting
• August 17, 2009 – Functional Plan Complete
Project Planning
Project Planning
Short-Term Solutions

• Significant queuing / delays - worst in the PM
Short Term Solutions

• Three optimization options:
  – Ban EBL
  – Ban WBL
  – Ban both EBL/WBL
• 14 sub-options on how to achieve these
Short-Term Solutions

- Detours
Short-Term Solutions

• Jug-handles
Short-Term Solutions

- Recommended – EBL ban w/ Bowtie Roundabout
Short Term Solutions

- August 20, 2009 – Begin detailed design
- August 25, 2009 – Complete detailed design
- August 27, 2009 – Pre-construction meeting
- October 2, 2009 – Project open to traffic
Short-Term Solutions
Short-Term Solutions

- Immediate travel time improvements

<table>
<thead>
<tr>
<th>Movement</th>
<th>Before</th>
<th>After</th>
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<tbody>
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<td>SB - PM</td>
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!!!!!!
Planning Timelines

• September 14, 2009 – Council-approved plan
  Build within one year!
Design Stage

- October 28, 2009 – design proposal submission
- November 6, 2009 – project start
- September 2010 – interchange opening deadline
Integrated Project Delivery

- Project delivered by Integrated Project Delivery.
- All parties have a vested interest in the timely completion of the project.
- All parties involved provided solutions to issues
- PARTNERING and cooperation by all.
Integrated Project Delivery

- December 14, 2009 – EOI Issued
- January 7, 2010 – EOI Closes
- Short-listed to 3 Contractors

- Anticipated Dates:
  - RFP / Tender February 1, 2010
  - Award March 15, 2010
  - Bridge Opening September 15, 2010
Design Stage
Design Stage
Design Stage

Friday, January 15, 2010  243 Days to Go
Design Stage

Friday, January 22, 2010   236 Days to Go
Design Stage

Monday, January 25, 2010  233 Days to Go
Design Stage

Friday, January 29, 2010
229 Days to Go
Tender

THE CITY OF CALGARY
TRANSPORTATION INFRASTRUCTURE

CONTRACT FOR THE CONSTRUCTION OF
TEMPORARY DETOUR AND PERMANENT ROADWORKS FOR
GLENMORE TRAIL/27 STREET SW INTERCHANGE

ISSUED FOR TENDER
FEBRUARY 04, 2010

READY FOR TENDER
Thursday, February 4, 2010
223 Days to Go
• Defer one month – redesign from scratch!
• Still be open by September 15, 2010
After lengthy deliberations and essentially reaching an impasse between the municipal and provincial visions in late January 2010, ISL and CH2M HILL responded with a plan to construct a temporary, low cost interchange as far away from the critical area of the ultimate SWRR as possible, and which could serve as the detour for the eventual SWRR construction. The new plan was the essence of simplicity, with two roundabout ramp terminals, one on each side of Glenmore Trail, that provide access to a two-lane fly-over situated to the east.
Bridge Design

• Has ISL done anything beyond the norm, NO!!!!

• ISL however has taken many innovative ideas and put them ALL into one interchange project

• The City of Calgary has accepted these innovative ideas as part of the design and has allowed the project to be completed in record time.
The project was temporary, some new approaches to construction were permitted having a design life of only 15-20 years.

- Full-depth, full-width precast bridge deck panels were allowed
- The three R’s of sustainability - Reduce, Re-use and Recycle - were adopted as a measure for the suitability of both design and materials.
- Re-usable pre-stressed girders, surplus to another project, were sourced and utilized.
- Spread footing bridge abutments were founded on Mechanically Stabilized Embankments (MSE) without piles, avoiding future abandonment of the piles underground.
- The fly-over bridge was designed so that it could be taken apart and re-used in its entirety, as were the MSE Wall Panels.
Plan view of the bridge. Very simple. Bridge is 44.5 m long with a deck that is 19.32 m wide. The bridge is on a 4% cross fall and a longitudinal grade of 2.1%.

Curved Road / Straight Bridge!
NEW RFP ISSUED @ 70% Design

Tuesday, March 9, 2010

190 Days to Go
Tender

• RFP Closed – April 1, 2010
• Contract Award – April 15, 2010
• 153 Days to Go
Construction

- Ready to Build – May 12, 2010
- 126 Days to Go!
Construction

May 21, 2010

117 Days to Go
Construction

Armtec Stockpiled Girders used for the G37 Project

2.4 NU Girder Stockpiled in Calgary
Construction

June 10, 2010
97 Days to Go
Construction

July 16, 2010

61 Days to Go
Construction

MSE Wall being completed
Along with Abutment

July 30, 2010
47 Days to Go
Construction

August 9, 2010

37 Days to Go
Completed Abutment on the eve of Girder Erection. The girders were erected over two nights from August 19 to 20.
Construction

NU 2.4 Girder Erection

August 19, 2010

27 Days to Go
NU Girder is prepared and ready to receive the full width deck panels. Styrofoam used to create girder haunches. With the girders at 5 years old very large cambers. Some girders The foam depth was 125mm at the abutments.
Deck Panel Design and Installation

- 225 pretensioned Deck panel total of 19 for the bridge
- 19.32m wide full depth deck panel
- Insulation
- New NU Girder
- 5 - 2.4 NU Girders existing

Construction
Construction

Detail of Deck Panels

CIP Infill concrete along transverse joint and infill holes over the girder
Construction

August 25, 2010
21 Days to Go
Construction

Installation of the full depth deck panels over three nights
Construction

Instant deck!
Construction

Reinforcing within Deck Panels and Infill Concrete

August 30, 2010
16 Days to Go
Completed deck with PL2 guardrail and pedestrian handrail installed

September 2, 2010
13 Days to Go
- Why no waterproofing?? First it was deemed that it could be too cold to guarantee the proper application. It was thought to place only butyl rubber, but when the shop drawing arrived it said it would need 50 mm of cover. The ACP was only 80mm would have left ridges. Xypex was placed on the joints. Did it work? In most parts yes. At this time with the 4% crossfall there is some water coming through the joints along the curb and this will be repaired in the spring.

It was mentioned that the bridge can be dismantled.
- This can be done by removing the ACP and then hydro demolish the C-I-P concrete infills in the deck panels. Once this is done the deck panels can be removed. Girders can then be unbolted from the bearings and moved. Demolish the abutment concrete and then the MSE wall panels can be removed from the strips. Voila the bridge is now gone.
Lessons Learned

a) Abutment resting on MSE wall, very good idea and fast.

b) Reinforcing Steel within the deck panel and extending through the holes over the girder was problematic. In the future best to use lenton couplers, this will definitely speed up the process and installation of the deck panels with no interference from reinforcing steel. Thought the rebar would help give the panel a little more rigidity but in the end was an issue with the panel installation.

c) Bridge appears to be functioning very well.
Construction

Saturday
Sept 4, 2010
11 Days to Go
Construction

The final Days
Construction

Saturday
Sept 11, 2010

4 Days to Spare
Construction

Completed Bridge September 11, 2010
Bridge open to traffic September 11, 2010
Construction

Saturday
Sept 11, 2010

4 Days to Spare
Construction

Nov 4, 2010

54 Days Later
A final thought…

So…
does it work?
A final thought...

Then why am I still stuck on Glenmore?
A final thought...

Blame Richard Road!
Acknowledgements

City of Calgary: Duane Delaney, Jadwiga Kroman, Jason Lin
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PCL: Duncan Fitzpatrick, Ian Ooi, Wade Straka

ISL: Calvin McClary, and everybody!

Editor: Vincent Hanley
The new interchange at Glenmore Trail and 37th Street S.W. is a prime example of how limited projects can bring huge benefits. The additional of a roundabout and overpass on 37th Street for left-turning traffic onto Glenmore and the corresponding removal of traffic lights has wrought an amazing change in traffic flow, reducing stops and starts and shortening commute times through the area. Construction was brief, minimally disruptive and did not landholders’ noses out of joint.

In other words, the interchange is an exemplary piece of work which should serve as a model for further improvements citywide.
February 4, 2011

Award of Excellence – Project Management
Teamwork!

Questions?