

Howard Avenue Grade Separation – A Value Partnership

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AECOM Canada

Windsor – Detroit Gateway

The Windsor-Detroit Gateway is a vital transportation artery between Canada and the United States.

- Busiest international trade corridor in North America
- Over 16 million cars and trucks cross the Windsor-Detroit Gateway every year
- In 2004, the Windsor-Detroit crossings handled \$158.7 billion in trade – 28% of total Canada-U.S. trade
- Severe traffic problems in the City of Windsor as a result of post 9-11 security measures.



- To effectively address the transportation needs in the Windsor-Detroit region, a multifaceted initiative is underway comprised of:

- **Detroit River International Crossing Study (Bi-national Study)**

- New end-to-end border crossing solution (access road, plazas and bridge crossing)



- ***Let's Get Windsor-Essex Moving (LGWEM)***

- A program of short and medium term projects to improve local movement of people and goods



- 17 border related transportation projects.
- Projects that improve traffic flows to existing crossings, address security issues and complement the outcome of the bi-national study.
- Initial commitment of \$300 Million
- The Ontario Ministry of Transportation is managing the delivery of projects in partnership with the municipalities (City of Windsor & County of Essex) and the federal government.





Project Location





Memorial

CPR Crossing

Eugene

Pointer 42°17'28.43" N 83°00'42.48" W elev 623 ft

Streaming ||||| 100%

Eye alt 2573 ft

VE Team Representation

- MTO
- City of Windsor
- CPR
- Hydro One
- MRC
- TSH



Project “Drivers” - Howard Ave Grade Separation

- Project need driven by 9/11 security impacts
- Vehicle and Cargo Inspection System (VACIS) gamma ray scanning of U.S.-bound trains
- Reduced rail speed to 7 mph
- Crossing delays increase by 50 % (Number of train delays longer than 20 minutes up from 1-3 to 6-9 per day)



Delay in Early Afternoon-Nov 12-07



Looking East from Howard Ave.



Looking West From Howard



VE Study Goals and Objectives

- Facilitate “Let’s Get Windsor-Essex Moving Strategy”
- Reduce Traffic Delay
- Maintain Project Schedule
- Minimize Construction Impacts
- *Satisfy Public Needs*

Project Status at Time of VE Study

- EA Approved
- Design had just commenced
- Profiles were preliminary
- Bridge alternatives were under consideration
- Alignments were being refined

- Introduction of VACIS has increased delay
- Existing hydro towers on north side
- CPR security vehicle accommodation
- Significant property impacts – \$10–11M
- City requested no closure of Howard Ave.
- ESR included west side detour
- Need for detour confirmed through traffic analysis
- CPR tracks can be out of service for short durations with advance planning (10 hrs)
- Significant utility conflicts
- Towers in close proximity complicate construction of underpass and constrain contractor's operation

Key VE Team Focus Areas

- CPR Bridge
- Property Impacts
- Construction Impacts – Maintenance of Traffic
- Ease of Construction
- Construction Duration

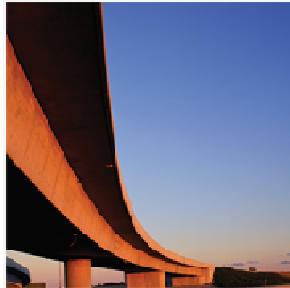
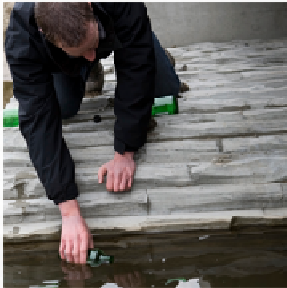
Project Performance Measures

- Roadway User Safety
- Community Access
- Constructability
- Construction Duration
- Construction Risk
- Utility Impacts
- End User Satisfaction
- Design Schedule
- Ease of Future Expansion

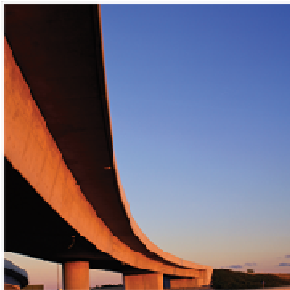
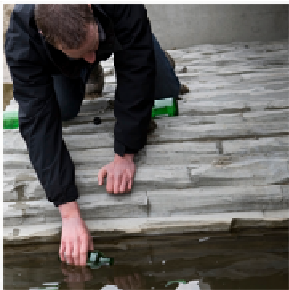


Creative Idea Summary

- Build Bridge
- Build Detour (road)
- Detour Rail
- Acquire Property
- Manage Drainage
- Manage Utilities
- Improve Aesthetics
- Reduce Schedule
- **TOTALS**
- 24 ideas – 9 shortlisted
- 9 ideas – 7 shortlisted
- 6 ideas – 4 shortlisted
- 10 ideas – 6 shortlisted
- 2 ideas – 2 shortlisted
- 10 ideas – 10 shortlisted
- 2 ideas – 2 shortlisted
- 4 ideas – 4 shortlisted
- **67 ideas – 44 shortlisted**



Selected VE Recommendations

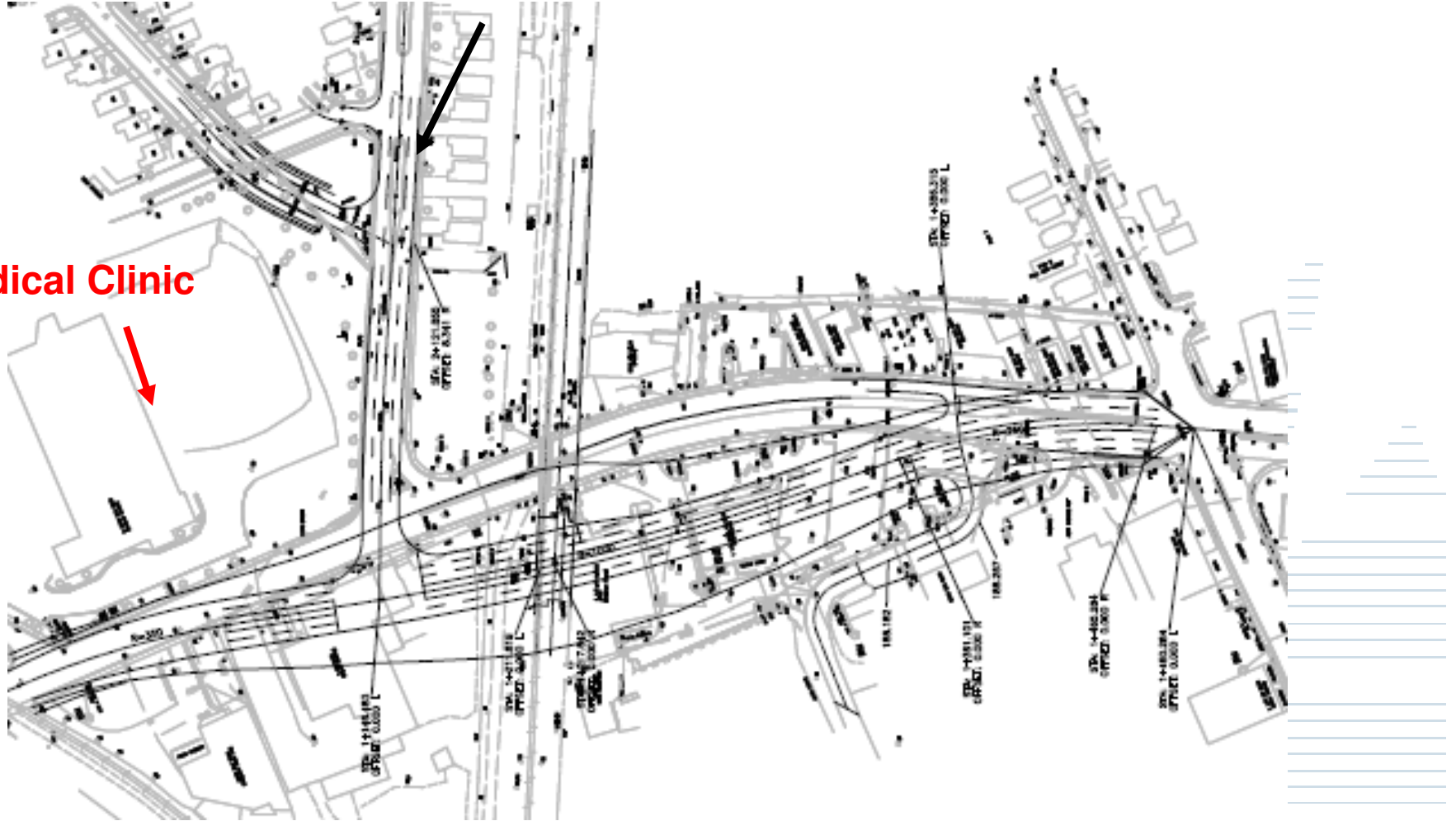


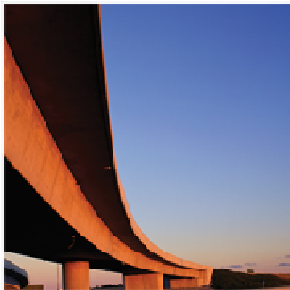
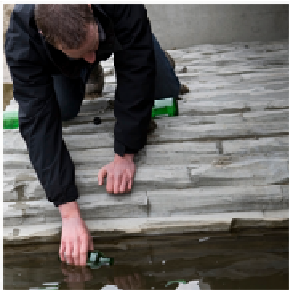
Reconstruct Memorial Ave. on Existing Alignment



Memorial Avenue

Medical Clinic

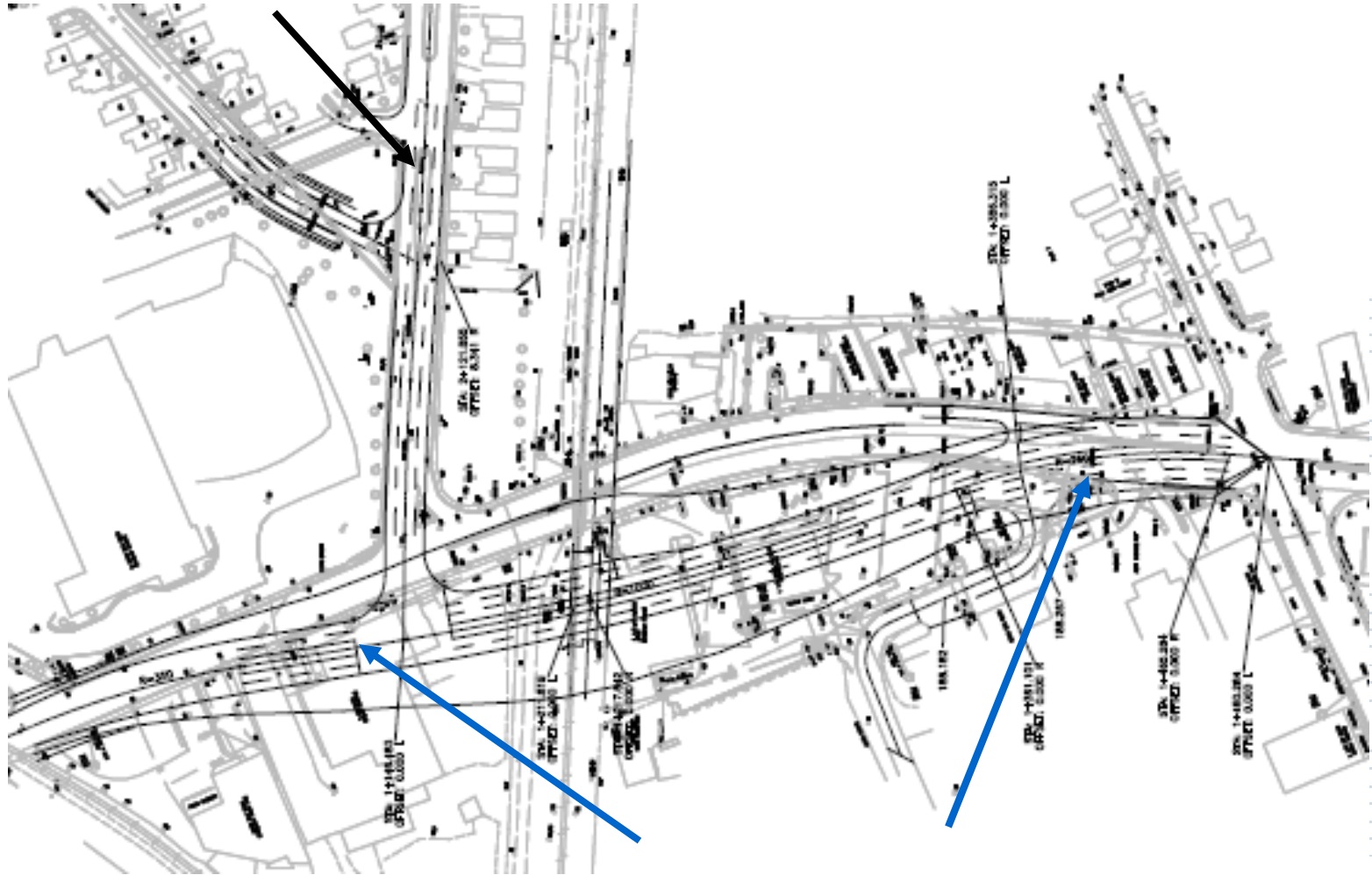




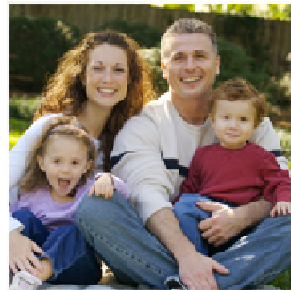
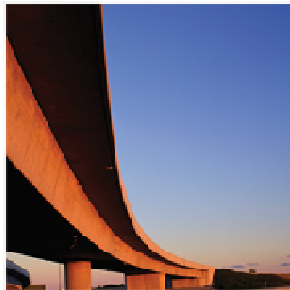
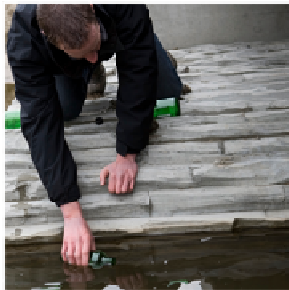
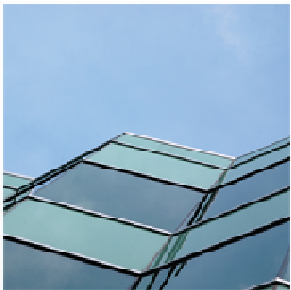
Construct a New Permanent Alignment for Howard Ave. and Eliminate Detour



Memorial Avenue



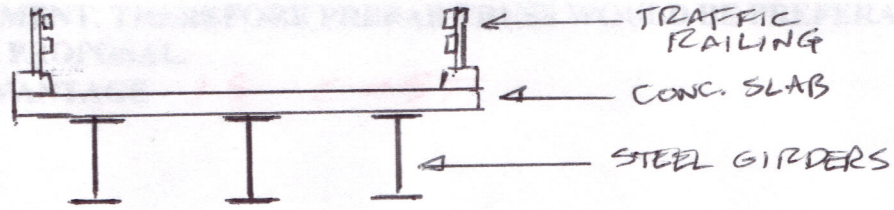
New Alignment for Howard Ave



Use prefabricated truss for security vehicle bridge

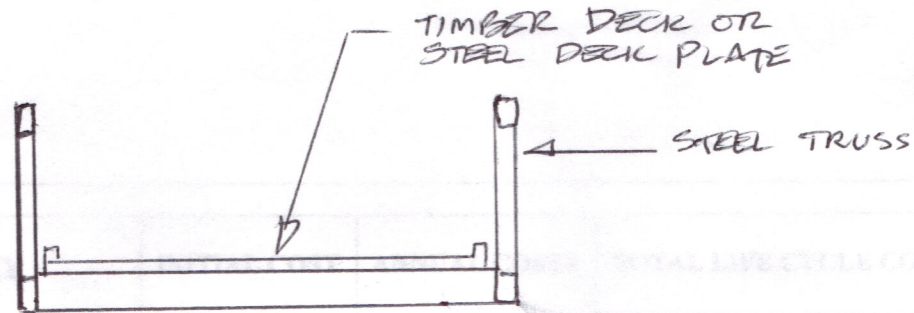
BASE DESIGN (Attach larger sketch/plan if appropriate)

- BOTH TEMPORARY MODULAR BRIDGE & PRECAST TRUSS CAN BE CONSIDERED. HOWEVER TIM IS VERY UNATTRACTIVE IN AN URBAN ENVIRONMENT. THEREFORE PRECAST IS MORE OPERABLE FOR THIS PROJECT.
- MAIN ARCH



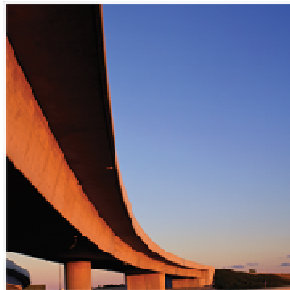
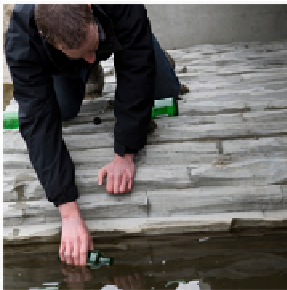
X-SECTION

PROPOSED DESIGN (Attach larger sketch/plan if appropriate)



X-SECTION

BB 3

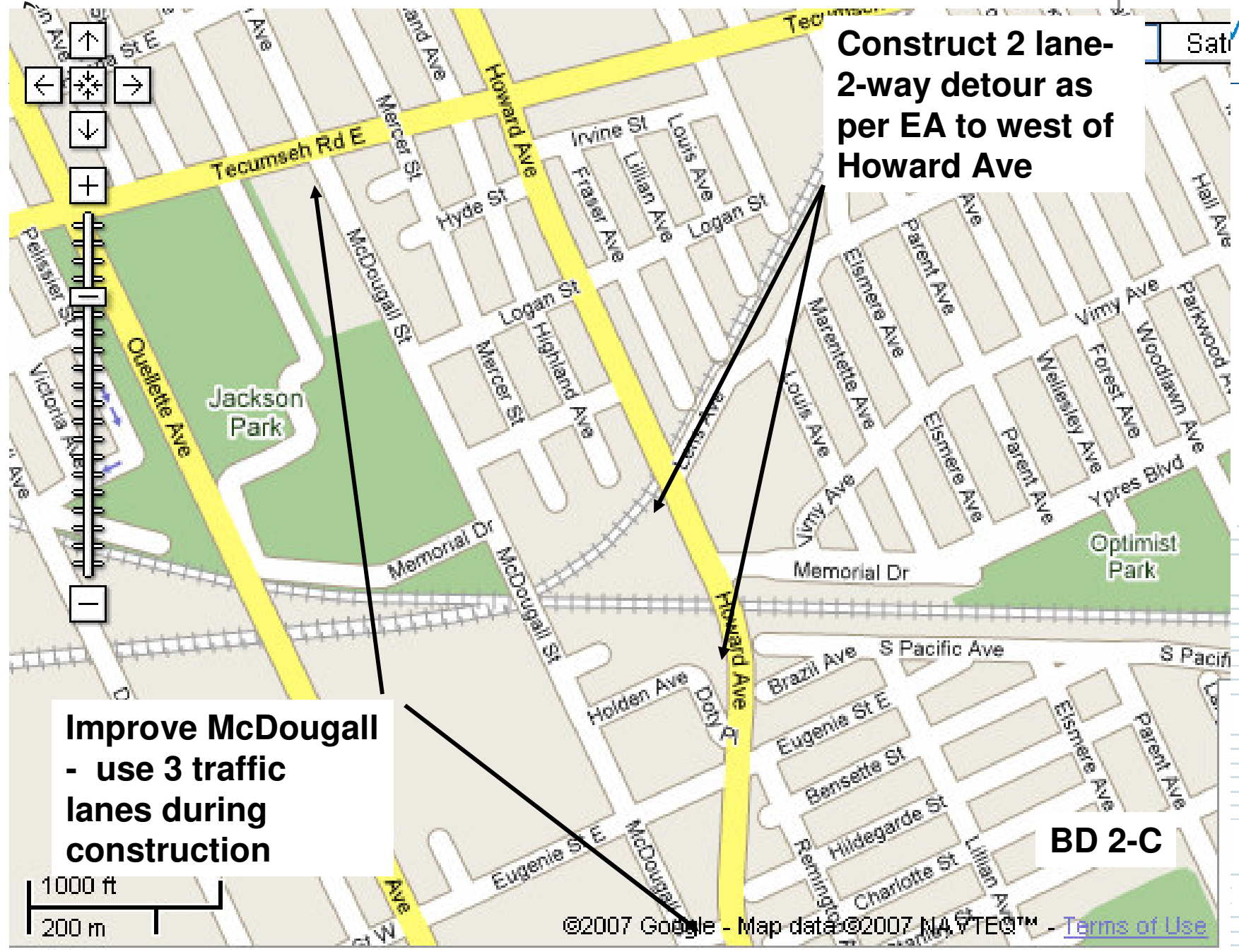
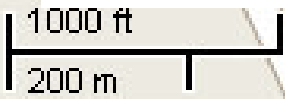


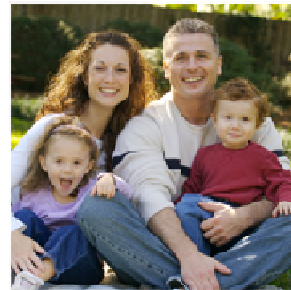
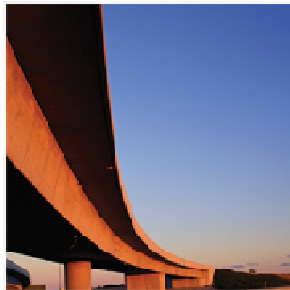
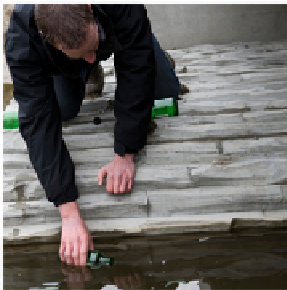
Use Two Detours During Construction – Howard Ave. and Improved McDougall

Construct 2 lane-2-way detour as per EA to west of Howard Ave

Improve McDougall - use 3 traffic lanes during construction

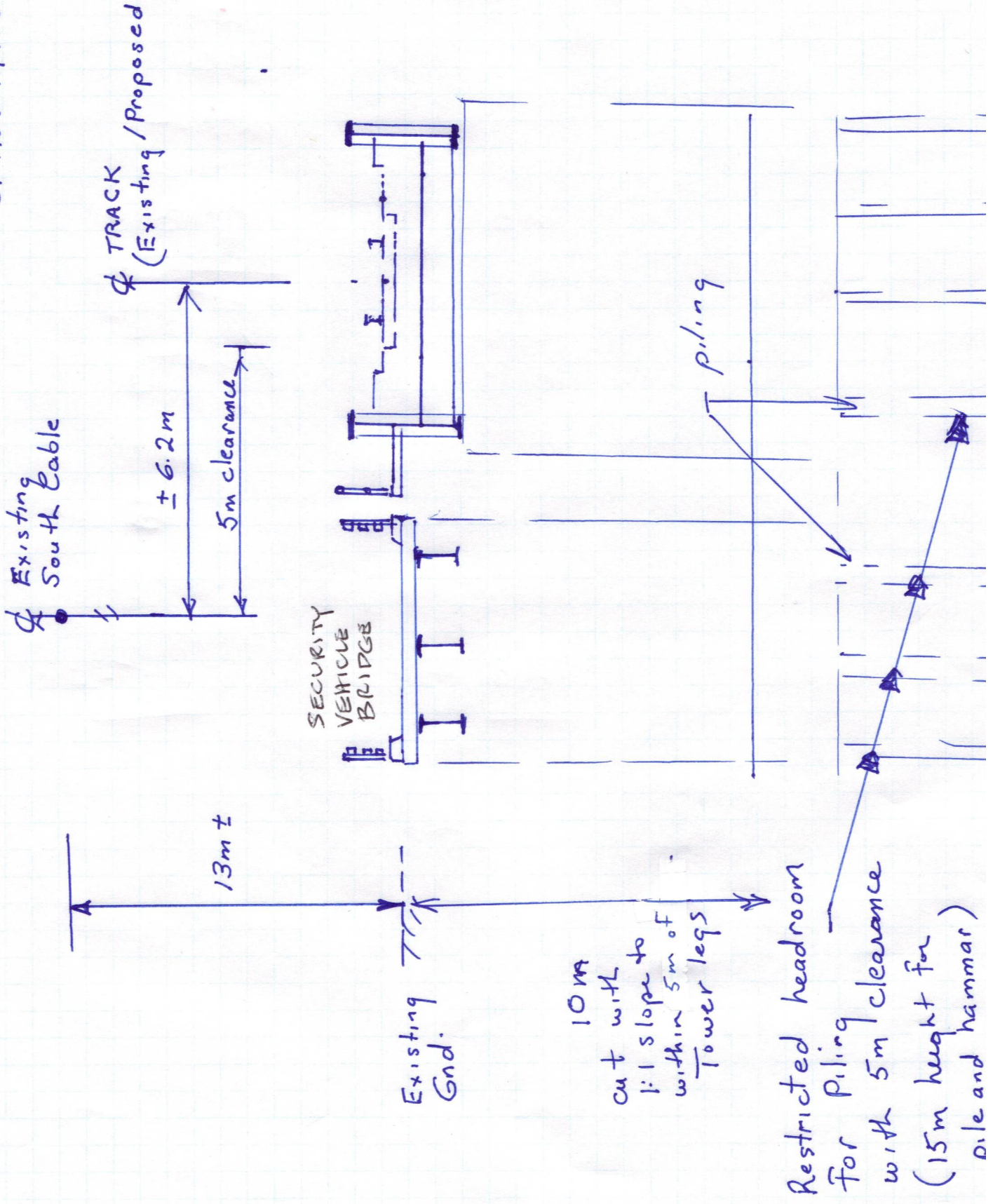
BD 2-C

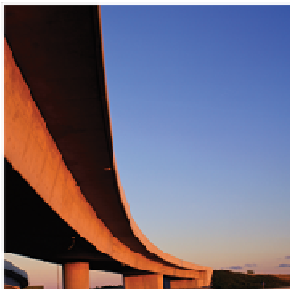
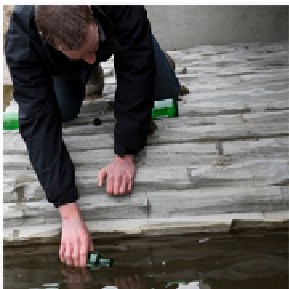




Work Under Hydro Lines - Single Rail Steel Bridge on Existing Alignment

OPTION m410

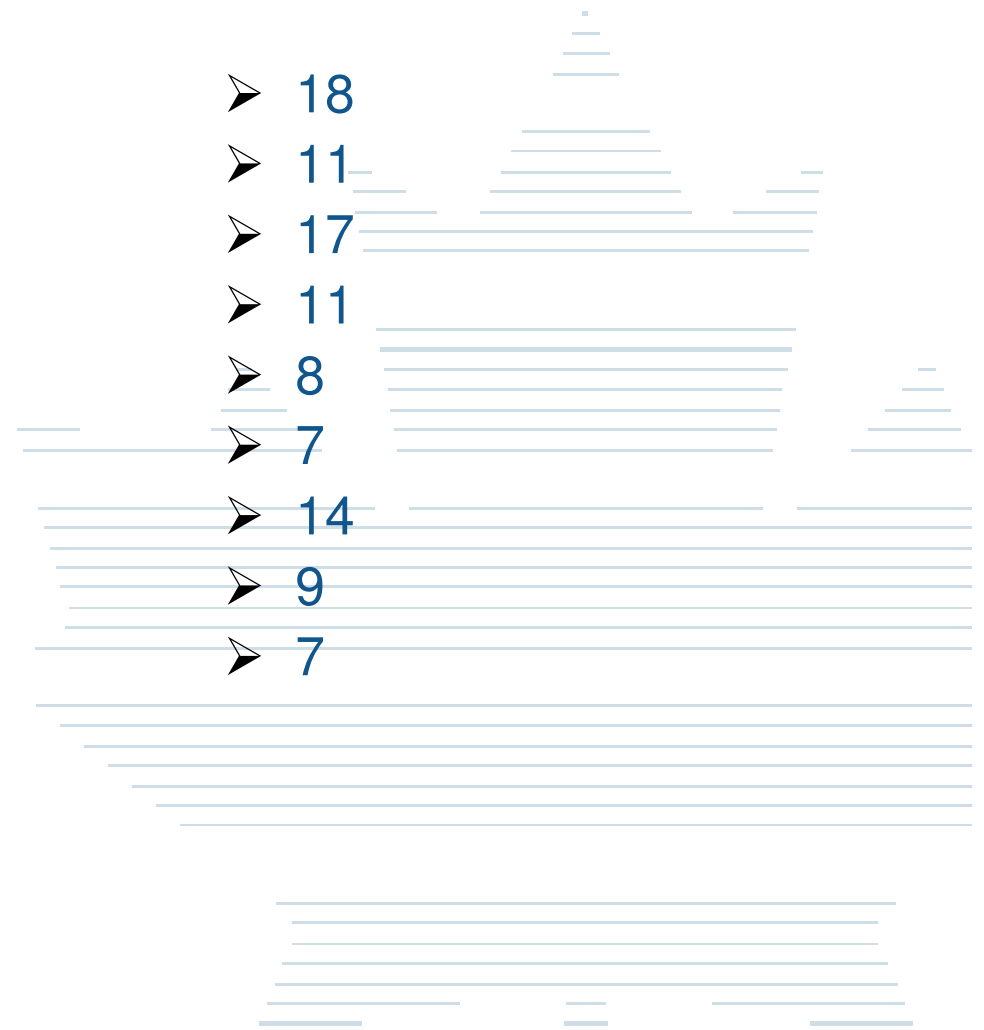




Scenarios

Performance Measure Weights

- Roadway User Safety ➤ 18
- Community Access ➤ 11
- Constructability ➤ 17
- Construction Duration ➤ 11
- Construction Risk ➤ 8
- Utility Impacts ➤ 7
- End User Satisfaction ➤ 14
- Design Schedule ➤ 9
- Ease of Expansion ➤ 7



Scenario #1 - EA

- Build 4-lane detour for Howard Avenue
- Concrete Bridge – use future 2nd track for security vehicle
- 3:1 slopes resulting in significant property requirements on both sides of Howard Ave
- Realignment of Memorial Drive to north on new alignment

Scenario 2 – Modified EA

- Single track steel bridge
- Modular bridge for security vehicle
- On site detour – 2 or 4 lanes (depends on McDougall Ave)
- Reconstruct Memorial Drive on existing alignment
- Minimize east side property requirements – particularly at south end

Scenario 3 – Realigned Howard Ave.

- Single track steel bridge
- Modular bridge for security vehicle
- Reconstruct Memorial Drive on existing alignment
- Realign Howard Ave to west on permanent new alignment and use existing for detour
- Minimize east side property requirements and provide service road for access

Scenario Results

- Scenario 1 – EA
- Scenario 2 – Modified EA
- Scenario 3 – Realigned Howard Ave

• 581
• 641
• 660

Note: The difference between Scenarios 2 and 3 is statistically insignificant; but both were preferred over the original EA design.

Performance/Cost Comparison

- Scenario #1 - $581/\$27.1 = 21.4$
- Scenario #2 - $641/\$24.7 = 25.6$
- Scenario #3 - $660/\$23.3 = 28.3$

Higher ratios are preferred; based on the foregoing, the VE team recommended Scenario #3, Realign Howard Avenue.

- The project design and property acquisition is at 75% completion and is proceeding toward construction
- The VE Workshop provided recommendations that added value, reduced property impacts and improved constructability.
- Most of the recommendations have been incorporated into the project.



- Design recommendations that minimize property takings
 - Property buy-outs had previously been initiated on some properties identified
 - Timing of VE a compromise between level of design data vs. early identification of property needs.



- Structure Types
 - Steel Girder bridge trades-off increased structure cost vs. profile/property benefits
 - Prefabricated Truss security vehicle bridge
 - CPR buy-in to project established



- VE workshop at the beginning of design phase provided opportunities to add value.
- Involvement of key members of the new design team improved idea transfer beyond what was recorded in the report.
- Participation of external project stakeholders a proactive way to bring out ideas and promote buy-in.

